C21.5: 954/3

Vol. 954 Number 3

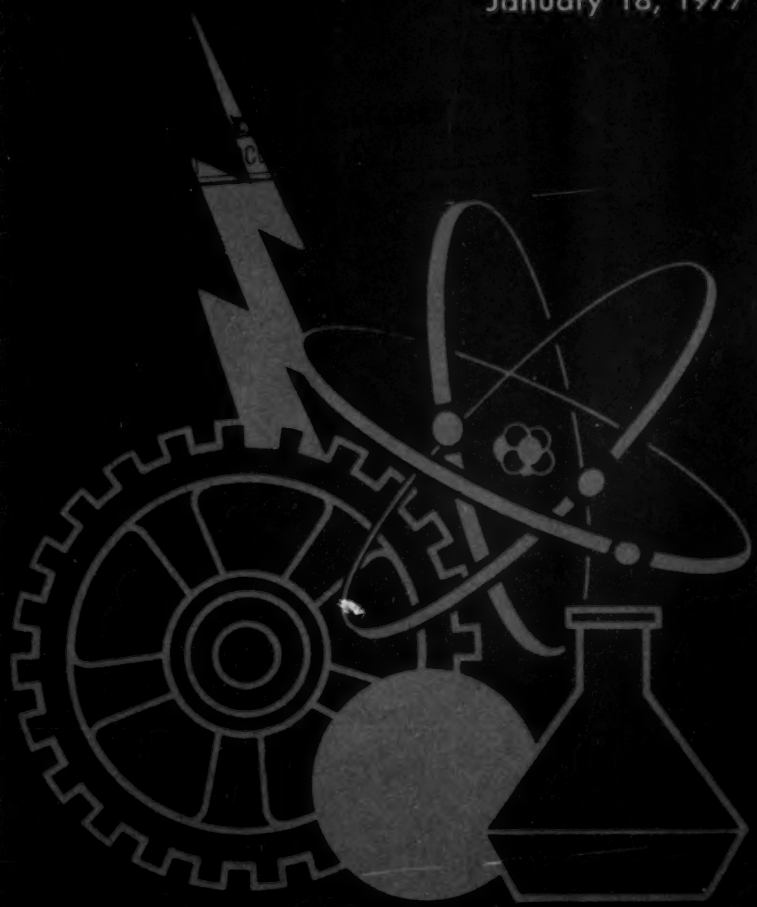
OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

January 18, 1977



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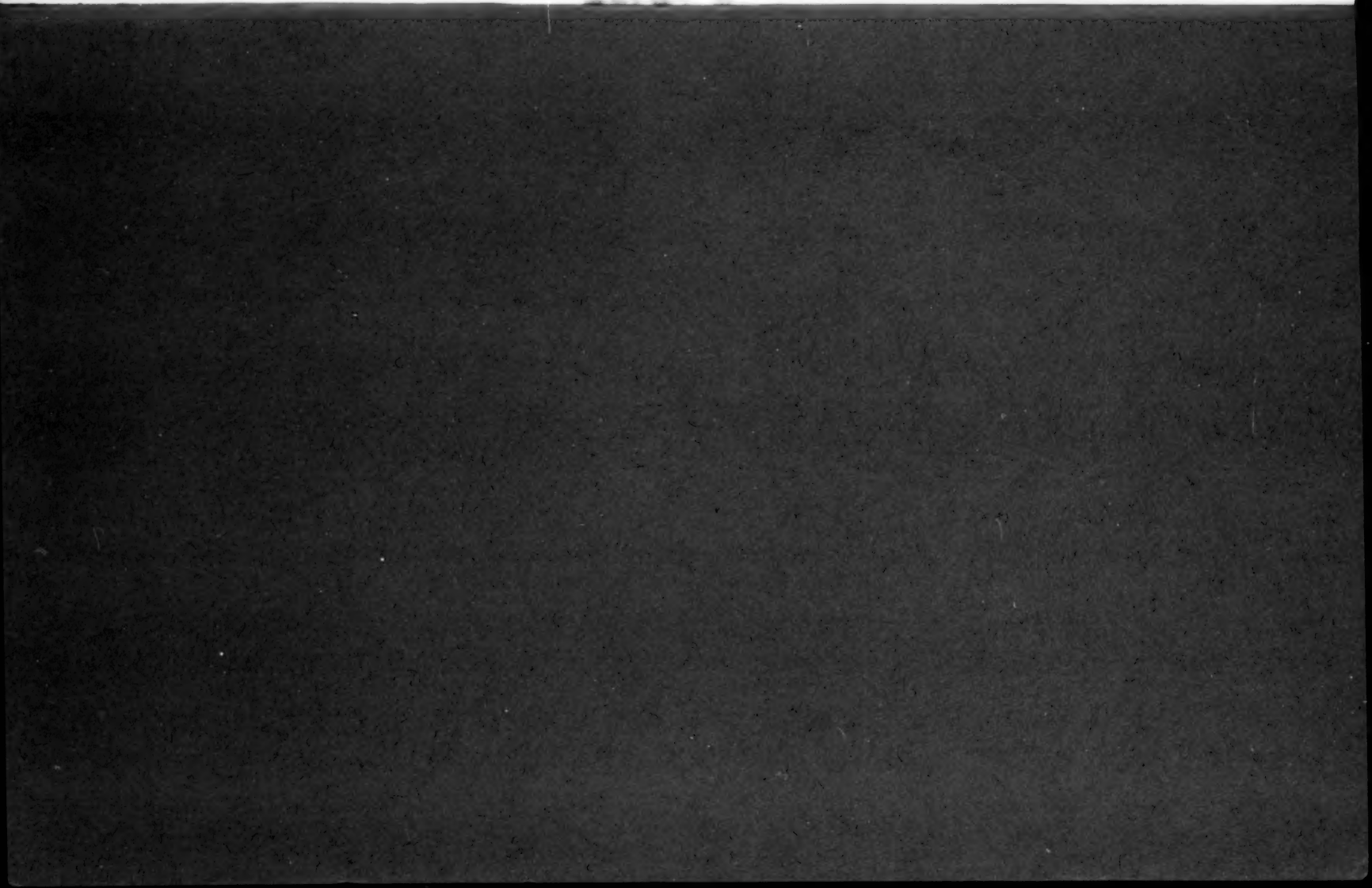

OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

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PATENT AND TRADEMARK OFFICE NOTICES

October and November 1976 Classification Orders

The reclassifications covered by the following classification changes became effective during October and November 1976.

Classification Order	Class	Subclasses
545, effective Nov. 1, 1976:		
Abolished	206	2; 10; 84 and 808.
Established	206	213.1; 278.1; 484.1; 484.2; 524.1–524.9.
Position changes	206	213.
Title changes	206	205; 484 and 525.
546, effective Nov. 2, 1976:		
Abolished	296	37.
Established	296	37.1; 37.3–37.9; 37.11–37.16.
547, effective Nov. 3, 1976:		
Abolished	239	533–533.
Established	239	533.1–533.9; 533.11–533.15.
548, effective Nov. 8, 1976:		
Abolished	244	12 and 129.
Established	244	12.1–12.6 and 129.1–129.6.
549, effective Nov. 9, 1976:		
Abolished	180	89.
Established	180	89.1; 89.11–89.19.
550, effective Nov. 10, 1976:		
Abolished	346	74.
Established	346	150–165.
551, effective Nov. 10, 1976:		
Abolished	415	198 and 199.
Established	415	198.1; 198.2; 199.1–199.6.
552, effective Nov. 12, 1976:		
Abolished	118	637.
Established	118	644–662.
553, effective Nov. 12, 1976:		
Abolished	166	224–226.
Established	166	316–334.
554, effective Nov. 12, 1976:		
Abolished	403	232.
Established	403	232.1.
Title changes	403	189.
555, effective Nov. 17, 1976:		
Abolished	211	54; 57 and 59.
Established	211	54.1; 57.1 and 59.1.
556, effective Nov. 22, 1976:		
Abolished	47	1.2 and 34–38.1.
Established	47	59–87.
557, effective Nov. 23, 1976:		
Abolished	424	248.
Established	424	248.4; 248.5; 248.51–248.58.
558, effective Nov. 24, 1976:		
Established	222	629.
559, effective Nov. 24, 1976:		
Established	423	179.5.
560, effective Nov. 29, 1976:		
Abolished	178	5–14 and 69.5.
Established	178	69.1.
	358	83–305.

ALFRED C. MARMOR

Administrator for Documentation
December 21, 1976

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,685,536, Starkey and Ransburg, METHOD FOR ELECTROSTATICALLY COATING ARTICLES; **2,794,417,** same, APPARATUS FOR ELECTROSTATICALLY COATING ARTICLES; **2,893,893,** W. W. Crouse, METHOD AND APPARATUS FOR ELECTROSTATIC COATING; **2,893,894,** E. M. Ransburg, METHOD AND APPARATUS FOR ELECTROSTATICALLY COATING, **filed** Mar. 27, 1974, D.C.N.J. (Newark) Doc. C–74–436, *Ransburg Corporation* v. *Baylis Industries Inc.* Order for dismissal of action July 13, 1976. **Same, filed** Mar. 1, 1973, D.C., E.D. Pa. (Philadelphia) Doc. C.A. 73–475. *Ransburg Corporation* v. *Slaymaker Lock Company Inc.* Ordered, patents are valid and enforceable. This judgment is entered on Ransburg complaint against Slaymaker, Sept. 21, 1976.

2,794,417. (See 2,685,536.)

2,893,893. (See 2,685,536.)

2,893,894. (See 2,685,536.)

2,975,330, Bloom and Bell. ELECTRODELESS DISCHARGE METHOD AND APPARATUS; **3,071,721,** H. G. Dehmelt, OPTICAL ABSORPTION MONITORING OF ORIENTED OR ALIGNED QUANTUM SYSTEMS; **3,150,313,** same, MODULATION OF A LIGHT BEAM BY ABSORBING QUANTUM SYSTEMS EXHIBITING A PERIODICALLY VARYING ALIGNMENT; **3,187,251,** W. E. Bell, QUANTUM OSCILLATORS; **3,246,254,** Bell and Bloom, ATOMIC STABILIZED FREQUENCY SOURCE; **3,267,360,** H. G. Dehmelt, OPTICAL ABSORPTION MONITORING OF ALIGNED ALKALI ATOMS; **3,363,193,** J. T. Arnold, ADJUSTABLE FREQUENCY ATOMIC FREQUENCY STANDARD; **3,382,452,** Rempel, Swartz, Packard and Rorden, FREQUENCY STABILIZATION APPARATUS; **3,408,591,** A. L. Helgesson, TIME SCALE CHANGER FOR ATOMIC STABILIZED FREQUENCY SOURCES; **3,575,655,** H. G. Dehmelt, APPARATUS FOR OPTICALLY MONITORING THE GYROMAGNETIC RESONANCE OF QUANTUM SYSTEMS; **3,584,292,** H. G. Dehmelt, same; **Re. 23,950,** Bloch and Hansen, METHOD AND MEANS FOR CHEMICAL ANALYSIS BY NUCLEAR INDUCTIONS, **filed** July 9, 1974, United States Court of Claims, Doc. 250–74, *Varian Associated* v. *The United States.* Ordered that judgment be and the same is entered for the plaintiff against the United States, Sept. 10, 1976.

3,071,721. (See 2,975,330.)

3,107,613, Armstrong, Parshall and Thatcher, NEW COMPOSITION; **3,126,305,** R. K. Armstrong, IGNITION COMPOSITIONS COMPRISING BORON CONTAINING SALTS; **3,148,938,** W. H. Knoth, AMMONIA AND HYDRAGINE SALTS OF THE $B_{10}H_{10}^{-2}$ ANION; **3,149,163,** same, AMINE AND ORGANO-SUBSTITUTED HYDRAZINE SALTS OF THE $B_{10}H_{10}^{-2}$ ANION AND PROCESS FOR PREPARING SAME; **3,149,939,** B. W. Larsen, CENTRIFUGAL SEPARATOR; **3,184,286,** D. C. England, $C_{32}B_{18}H_{12}C_8NO_3$ PRODUCT AND PROCESS FOR MAKING SAME; **3,365,275,** E. L. Muetterties, POLYHYDROPOLYBORATES AND PROCESSES FOR PREPARING THEM; **3,431,089,** V. A. Engelhardt, REACTION PRODUCTS AND PROCESSES; **3,446,604,** E. L. Muetterties, ACID AND SALTS OF $B_{20}H_{18}^{-2}$ION, **filed** Sept. 3, 1976, D.C., N.D. Calif. (San Francisco) Doc. C–76–1892–CBR, *Teledyne McCormick Selph* v. *Robert C. Allen, doing business as R & N Chemical Company.*

3,126,305. (See 3,107,613.)

3,131,106, F. W. Mackenzie, ADHESIVE TRANSFERS; **3,212,913,** same, **filed** Jan. 30, 1974, D.C., N.D. Ill. (Chicago) Doc. 74–C–289, *Letraset USA Inc.* v. *Pressure Graphics Inc.* Ordered, U.S. Letters Patent are valid, the defendants' counterclaims are hereby dismissed with prejudice. Defendant and all persons in active concert or participation with any of them, are hereby restrained and enjoined. Plaintiff is entitled to and is hereby awarded judgment, July 22, 1975.

3,148,938. (See 3,107,613.)

3,149,163. (See 3,107,613.)

3,149,939. (See 3,107,613.)

3,150,313. (See 2,975,330.)

3,164,288, C. J. Boomgaard, CLOSURE AND VALVE CONSTRUCTION; **3,601,181,** W. C. Avrea, METHOD AND APPARATUS FOR PURGING AIR FROM INTERNAL COMBUSTION ENGINE COOLING SYSTEMS; **Re. 27,695,** A. F. Barnes, BEET TOPPING ASSEMBLY, **filed** May 28, 1976, D.C. Ariz. (Phoenix) Doc. 76–374–Phx, *Saf-Gard Systems Inc.* v. *Performance Products Inc., Peter D. Avrea, Walter C. Avrea, Dilworth C. Brinton and William Campbell.*

3,181,991, N. G. Leveskis, PIGMENTED PEROXIDE COMPOSITIONS; **3,182,036,** Baptist and Werber, PLASTICIZED POLY-BETA-HYDROXYBUTYRIC ACID AND PROCESS; **3,507,800,** N. G. Leveskis, FLAME RESISTANT PEROXIDES, **filed** Nov. 24, 1975, D.C., N.D. Calif. (San Francisco) Doc. C–

75–2483–OJC, *Argus Chemical Corporation* v. *Pacific Coast Lacquer Co. et al.* Defendants enjoined permanently from infringing plaintiff's valid patents, judgment by consent, Aug. 25, 1976.

3,182,036. (See 3,181,991.)

3,184,286. (See 3,107,613.)

3,187,251. (See 2,975,330.)

3,212,913. (See 3,131,106.)

3,217,546, Cordell and Gustafson, AUTOMATIC GRAIN SAMPLING DEVICE; **3,217,549,** same; **3,383,924,** R. R. Cordell, RETRACTABLE SAMPLING DEVICE FOR PRESSURIZED CONVEYORS, **filed** June 4, 1976, D.C., S.D. Iowa (Des Moines) Doc. 76–192–1, *Gustafson Inc.* v. *Corn States Hybrid Service Inc.*

3,217,549. (See 3,217,546.)

3,237,319, A. W. Hanson, SKI BOOTS HAVING A THIXOTROPIC MATERIAL ENCIRCLING THE ANKLE PORTION THEREOF; **3,402,411,** same, PROCESS FOR MAKING BOOTS, SPORTS EQUIPMENT AND HATS, **filed** Aug. 25, 1976, D.C., N.D. Utah (Salt Lake City), Doc. NC–76–42, *University Patents Inc.* v. *RNC Inc., Nordica Calzaturificio di A. F. Vaccari and C. Sas, and Rossignol Ski Co., Inc.*

3,246,254. (See 2,975,330.)

3,267,360. (See 2,975,330.)

3,363,193. (See 2,975,330.)

3,365,275. (See 3,107,613.)

3,382,452. (See 2,975,330.)

3,383,924. (See 3,217,546.)

3,402,411. (See 3,237,319.)

3,408,591. (See 2,975,330.)

3,431,089. (See 3,107,613.)

3,446,601. (See 3,107,613.)

3,499,302, Spain, Oliver, Flora and Powell, CYLINDER LOCK; **Reg. No. 878,843,** Richmar Products Inc. (GREAT LEGS AND DESIGN), **filed** Apr. 22, 1975, D.C., N.D.N.Y. (Utica) Doc. 75–CV–191, *Medeco Security Locks Inc.* v. *Dominion Lock-USA Inc., and Dominion Lock Co. Ltd.* Consent decree was filed on Aug. 14, 1975.

3,504,420, R. F. Shores, PLUGGING DEVICE; **3,586,202,** same, **filed** May 25, 1976, D.C. Md. (Baltimore) Doc. N76–788, *Ray Shores and Norma Pugh* v. *R.P.S. Products Inc. et al.*

3,507,800. (See 3,181,991.)

3,519,617, Rast and Steiner, RED PHENYL-AZO-NAPHTHOL DYESTUFFS FOR EDIBLE COMPOSITIONS; **3,640,733,** same, EDIBLE SUBSTRATES COLORED WITH MONOAZO DYESTUFFS, **filed** June 22, 1976, D.C., S.D.N.Y., Doc. 76–C–2744 MEF, *Warner-Jenkinson Co. and H. Kohnstamm & Co. Inc.* v. *Allied Chemical Corporation.*

3,524,023, S. Whang, BAND LIMITED TELEPHONE LINE DATA COMMUNICATION SYSTEM; **3,619,503,** R. Ragsdale, PHASE AND AMPLITUDE MODULATED MODEM; **3,783,194,** Vilips, Lowey and Payne, DATA MODEM HAVING A FAST TURN-AROUND TIME OVER DIRECT DISTANCE DIALED NETWORKS, **filed** Sept. 13, 1976, First Circuit Court, Boston, Doc. 76–1483, *Codex Corp. and Yellow Freight System Inc.* v. *Milgo Electronic Corp. and International Communication Corp.*

3,563,390, C. C. Shivvers, METHOD FOR CIRCULATING GRAIN STORED IN A CIRCULAR BIN; **3,765,547,** same, APPARATUS FOR CIRCULATING GRAIN STORED IN A CIRCULAR BIN; **3,765,548,** same, SWEEP AUGER STRUCTURE, **filed** July 14, 1976, D.C., S.D. Iowa (Des Moines) Doc. 76–222–1, *Nebraska Engineering Corporation* v. *Shivvers Enterprises Inc. and Charles C. Shivvers.*

3,567,117, W. E. Eustis, ICE NUCLEI FORMATION; **3,733,029,** Eustis and Howell, SNOW PRECIPITATOR; **3,774,842,** W. E. Howell, METHOD OF PRESERVING ICE NUCLEI FOR SNOW FORMATION, **filed** Jan. 9, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c67, *Hedco Inc.* v. *Villa Olivia Country Club Inc.* Stipulated dismissal on May 26, 1976.

3,575,655. (See 2,975,330.)

3,584,292. (See 2,975,330.)

3,586,202. (See 3,504,420.)

3,601,181. (See 3,164,288.)

3,619,503. (See 3,524,023.)

3,640,733. (See 3,519,617.)

3,669,499, Semplonius and Kolk, CHAIR, **filed** Dec. 12, 1975, D.C., E.D. Mo. (St. Louis), Doc. 75–1130C(2), *Harvard Industries Inc.* v. *Stellcase Inc.* Motion of defendant to dismiss, stay and or transfer this action to U.S. District Court of Delaware, Aug. 11, 1976.

3,699,604, S. J. Hunt, BUTCHER'S BONE DUST SCRAPER; **D. 229,397,** same, **filed** Jan. 29, 1975, D.C., E.D. Mich. (Detroit) Doc. 75–70171, *Vulcan Corporation and Hubert Distributing Company* v. *Detroit Cutlery Rental Service Inc.*

3,733,029. (See 3,567,117.)

3,765,547. (See 3,563,390.)

3,765,548. (See 3,563,390.)

3,774,842. (See 3,567,117.)

3,778,614, G. N. Hounsfield, METHOD AND APPARATUS FOR MEASURING X-OR-Y RADIATION ABSORPTION OR TRANSMISSION AT PLURAL ANGLES AND ANALYZING THE DATA; **3,866,047,** same, PENETRATING RADIATION EXAMINING APPARATUS HAVING A SCANNING COLLIMATOR; **3,919,552,** same, METHOD OF AND APPARATUS FOR EXAMINING A BODY BY RADIATION SUCH AS X OR GAMMA RADIATION; **3,924,129,** C. LeMay, METHOD AND APPARATUS FOR CONSTRUCTING A REPRESENTATION OF A PLANAR'S SLICE OF BODY EXPOSED TO PENETRATING RADIATION; **3,924,131,** G. N. Hounsfield, METHOD OF AND APPARATUS FOR EXAMINING A BODY BY RADIATION SUCH AS X OR GAMMA RADIATION; **3,944,833,** same, APPARATUS FOR EXAMINING A BODY BY RADIATION SUCH AS X OR GAMMA RADIATION; **3,946,234,** same, APPARATUS FOR EXAMINING BODIES BY MEANS OF PENETRATING RADIATION; **3,956,633,** same, RADIOLOGY METHOD AND APPARATUS; **3,965,357,** same, APPARATUS FOR EXAMINING A BODY BY MEANS OF PENETRATING RADIATION, **filed** July 12, 1976, D.C., N.D. Ohio (Cleveland) Doc. C–76–684, *EMI Limited* v. *Ohio Nuclear Inc.*

3,783,194. (See 3,524,023.)

3,866,047. (See 3,778,614.)

3,887,187, Crossman, Kenrick and LeMieux, AIR CUSHION TABLE GAME; **3,927,885,** same, PUCK AND BAT FOR AN AIR CUSHION TABLE GAME, **filed** Aug. 6, 1976, D.C., S.D.N.Y., Doc. 76–C–3508, *Brunswick Corporation* v. *Brewster Industries Inc.*

3,902,548, Lee and Asbo, PAPER FEED SYSTEM FOR HIGH-SPEED PRINTER; **3,954,163,** A. Gabor, HIGH SPEED PRINTER WITH INTERMITTENT PRINT WHEEL AND CARRIAGE MOVEMENT, **filed** May 7, 1976, D.C., N.D. Calif. (San Francisco) Doc. C–76–934 GBH, *Xerox Corporation* v. *Qume Corporation and Sen Lin Lee, also known as David Lee.*

3,915,362, D. G. Hart, VEHICLE LUGGAGE CARRIER AND COMPLEMENTARY MOUNTING MEMBERS; **D. 235,428,** same, CAR TOP LUGGAGE CARRIER, **filed** Sept. 16, 1976, D.C., N.D. Iowa (Fort Dodge) Doc. C–76–3035, *Donald G. Hart and Creataform Ltd.* v. *Winnebago Industries Inc.*

3,919,552. (See 3,778,614.)

3,924,129. (See 3,778,614.)

3,924,131. (See 3,778,614.)

3,927,885. (See 3,887,187.)

3,944,833. (See 3,778,614.)

3,946,234. (See 3,778,614.)

3,954,163. (See 3,902,584.)

3,956,633. (See 3,778,614.)

3,965,357. (See 3,778,614.)

Re. 23,950. (See 2,975,330.)

Re. 27,695. (See 3,601,181.)

D. 229,397. (See 3,699,604.)

D. 235,428. (See 3,915,362.)

D. 236,821. Larsen and Oehring, MOTORCYCLE SADDLE BAG; **D. 236,822,** same, MOTORCYCLE TOTE BOX; **Reg. No. 875,374,** Bates Industries Inc. (BATES), **filed** Mar. 30, 1976, D.C., N.D. Tex. (Dallas) Doc. CA 3–76–0462, *Bates Industries Inc.* v. *American Easy-Rider Inc.*

D. 236,822. (See 236,821.)

Reg. No. 878,843. (See 3,499,302.)

Reg. No. 875,374. (See 236,821.)

PATENT NOTICES

Certificates of Correction for the Week of Jan. 18, 1977

3,664,717	3,953,944	3,971,827	3,981,809
3,764,358	3,954,584	3,972,385	3,982,076
3,773,789	3,955,565	3,973,390	3,982,115
3,792,976	3,955,997	3,973,489	3,982,126
3,799,995	3,957,634	3,973,587	3,982,150
3,878,193	3,957,922	3,973,788	3,982,238
3,884,333	3,958,160	3,973,908	3,982,396
3,884,532	3,958,262	3,974,224	3,982,459
3,895,725	3,959,749	3,975,629	3,982,470
3,896,198	3,961,971	3,975,964	3,982,635
3,911,285	3,964,167	3,977,848	3,982,718
3,915,949	3,965,209	3,978,077	3,983,241
3,918,642	3,966,933	3,978,153	3,983,930
3,923,721	3,968,620	3,978,236	3,984,030
3,927,195	3,968,797	3,978,837	3,984,725
3,927,976	3,968,868	3,979,585	3,985,444
3,931,326	3,969,427	3,979,622	3,985,939
3,934,884	3,969,769	3,980,245	3,986,812
3,937,245	3,970,392	3,980,676	3,986,825
3,939,356	3,970,463	3,980,680	3,987,259
3,941,796	3,971,395	3,980,836	3,987,290
3,944,646	3,971,802	3,981,753	3,990,310

Disclaimer and Dedication

3,636,366.—*Edward Emanuel Sheldon*, New York, N.Y. OPTO-ELECTRIC SCREENS PROVIDED WITH LIGHT CONDUCTING MEMBERS. Patent dated Jan. 18, 1972. Disclaimer and Dedication filed Nov. 11, 1976, by the assignee, *American Optical Corporation*.

Hereby disclaims and dedicates to the Public the remaining term of said patent.

Dedications

Design No. 241,998.—*Mervin Rohrer*, Anoka, and *Carl Wettlaufer*, Albert Lea, Minn. ROTATABLE STORAGE UNIT OR SIMILAR ARTICLE. Patent dated Oct. 26, 1976. Dedication filed Nov. 24, 1976, by the assignee, *Litton Business Systems, Inc.*

Hereby dedicates the remaining term of said patent to the Public.

3,555,383.—*Donald J. Hackman*, Columbus, *Jeremy M. Harris*, Worthington, *Ronald L. Legue*, Columbus, and *Donald E. Roop*, Worthington, Ohio. SUBMERSIBLE ELECTRIC MOTOR FOR TOOL OPERATION. Patent dated Jan. 12, 1971. Dedication filed July 23, 1976, by the assignee, *The Battelle Development Corporation*.

Hereby dedicates to the People of the United States the entire remaining term of said patent.

Disclaimers

3,425,155.—*John W. Ryan*, Bel Air, and *Jack Lewis Lemkin*, Torrance, Calif. DOLL CONSTRUCTION FOR NATURAL MOVEMENTS AND POSITIONS. Patent dated Feb. 4, 1969. Disclaimer filed Aug. 30, 1976, by the assignee, *Mattel, Inc.*

Hereby enters this disclaimer to claims 1, 3, 6 and 7 of said patent.

3,994,319.—*Tom P. Airhart*, Hurst, Tex. REED TYPE VALVE FORMED OF HIGH MODULUS FIBER REINFORCED COMPOSITE MATERIAL. Patent dated Nov. 30, 1976. Disclaimer filed Aug. 20, 1976, by the inventor.

The term of this patent subsequent to Oct. 5, 1993 has been disclaimed.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF DECEMBER 18, 1976

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	2-2-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	4-22-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	11-11-75
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	2-11-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	1-8-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	8-12-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	2-19-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	12-17-75
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	6-21-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	1-22-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	6-10-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	2-26-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	5-5-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	3-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	1-12-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	5-20-76

Expiration of patents: The patents within the range of numbers indicated below expire during January 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,919,443 to 2,923,007 inclusive
Plant Patents..... Numbers 1,893 to 1,900, inclusive

REISSUES

JANUARY 18, 1977

NOTE—Cross reference listings of applications published under the first and second Trial Voluntary Protest Programs are located in the back of this Issue. These entries will be in numerical order by document publication number.

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

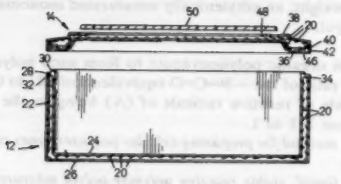
Re. 29,114
BURIAL VAULT

James H. McQuestion, 4460 Coral Drive, Brookfield, Wis. 53005

Original No. 3,839,768, dated Oct. 8, 1974, Ser. No. 341,688, Mar. 15, 1973. Application for reissue Sept. 29, 1975, Ser. No. 617,302

Int. Cl.² A61G 17/00

U.S. Cl. 27—35 6 Claims



5. A burial vault comprising a hollow rectangular shell preformed from a fiberglass resin composition, said shell including side walls, end walls and a base wall at the bottom closing the bottom of the side walls and end walls to form a chamber for a coffin,

a cement-sand-stone composition covering the outside surface of the side walls, end walls and base wall and a plurality of anchoring means partially embedded in the surface of the shell for mechanically locking the cement-sand-stone composition to the surfaces of the walls.

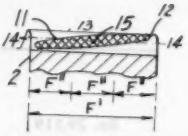
Re. 29,115
CONTACT GEARING

William S. Rouverol, 52 Lovell Ave., Mill Valley, Calif. 94941

Original No. 3,824,873, dated July 23, 1974, Ser. No. 99,587, Dec. 18, 1970. Application for reissue Feb. 18, 1975, Ser. No. 550,227

Int. Cl.² F16H 55/06

U.S. Cl. 74—462 55 Claims



1. A pair of mating gears comprising a driving gear and a driven gear turned by pressure exerted by the teeth of said driving gear, mechanical means connected to said driven gear to remove power therefrom, said teeth being formed to have active profiles in planes perpendicular to the pitch line for which the pressure angle is greater than 40°, the active portion of said profiles of one of said pair being curved, a portion of one working surface of the teeth of one of said pair intersecting the pitch circle of said one of said pair, *the radii of curvature of the undeformed profiles of the teeth of both of said pair being greater than half the circular pitch*, and both flanks of each of said teeth on one of said pair having at all points diametral pressure angles of at least 0°.

Re. 29,116
PRESSURE GAUGE

Billy Lynn Guy, and Walden Sam Campbell, both of Lexington, Ky., assignors to Kalinco, Inc., Lexington, Ky.

Original No. 3,592,218, dated July 13, 1971, Ser. No. 846,518, July 31, 1969. Application for reissue July 2, 1973, Ser. No. 375,468

Int. Cl.² F16K 15/20

U.S. Cl. 137—227 32 Claims

21. A combined gauge and inflator for indicating the fluid pressure in an enclosed chamber and allowing the supply of fluid thereto including:

a support member for connection to the enclosed chamber;

a body supported by said support member for movement between first and second positions;

said body and said support member cooperating to form a chamber therebetween when said body is in its first position;

said body having a passage extending therethrough to provide communication from exterior of said body to the chamber;

means to open a valve that controls communication to the enclosed chamber, said valve opening means being supported by said support member;

means urging said valve opening means to an inactive position;

means slidably disposed in said passage in said body;

said slidably disposed means being responsive to the fluid pressure in the enclosed chamber when said body is moved to its second position, said body moving said valve opening means to a valve opening position to open the valve that controls communication to the enclosed chamber when said body is in its second position;

at least one of said slidably disposed means and said body having sealing means to prevent flow of fluid through said passage when said body is in its second position;

means to indicate the fluid pressure of the enclosed chamber in accordance with the position of said slidably disposed means when said body is in its second position;

and said slidably disposed means has means to cause movement of said valve opening means to a valve opening position when said body is in its first position and said slidably disposed means is moved by a fluid dispensing chuck or the like to allow fluid to be supplied from the chuck through said body passage to the chamber and from the chamber to the enclosed chamber, said sealing means being rendered ineffective when said body is in its first position and said slidably disposed means has moved said valve opening means to its valve opening position.

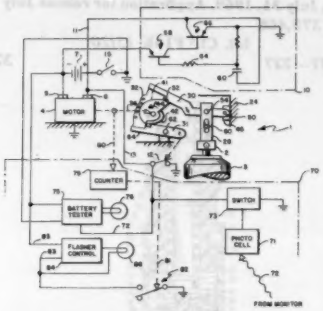
Re. 29,117
AUTOMATIC SPRAY DISPENSER WITH INTEGRATED TEST APPARATUS

Edward Sahajian, 98 Cedar St., Lexington, Mass. 02173, and Gottfried Maurer, 281 Country Way, Needham, Mass. 02192

Original No. 3,837,532, dated Sept. 24, 1974, Ser. No. 379,373, July 16, 1973. Application for reissue Sept. 22, 1975, Ser. No. 615,814

Int. Cl.[2] B67D *5/28*

U.S. Cl. 222—70 12 Claims



1. In automatic spray apparatus for use with an aerosol container having a [metering] valve mechanism which includes a spray valve moveable to an operative position to release a spray burst of material from the container at regular intervals, an electrical [motor] drive *means* for cyclically moving the spray valve to the operative position, a source of electrical energy for the drive *means* [motor, a motor switch actuated by the motor drive for coupling the source to the motor during a portion of the motor drive cycle] and a timer *means* for controlling energization of the [motor] *drive means at regular intervals, the improvement comprising a system* [, means] for testing said apparatus *and* comprising,

a light actuated photocell producing an electrical output, and

means, [a test switch in parallel with the motor switch] controlled by the photocell output, *for energizing said electrical drive means to cause said spray valve to move to an operative position,*

whereby *the apparatus which may be located in an out-of-reach location, may be tested for operativeness by illuminating the photocell, as with a flashlight, to cause the drive means to move* [illumination of the photocell causes the motor to drive through a cycle moving] the spray valve to the operative position.

Re. 29,118
METHOD OF PREPARING POLYURETHANES FROM LIQUID, STABLE, REACTIVE, FILM-FORMIN'G POLYMER/POLYOL MIXTURES FORMED BY POLYMERIZING AN ETHYLENICALLY UNSATURATED MONOMER IN A POLYOL

Paul Stamberger, 552 W. University Parkway, Baltimore, Md. 21210

Original No. 3,304,273, dated Feb. 14, 1967, Ser. No. 256,531, Feb. 6, 1963. Continuation-in-part of Ser. No. 155,467, Nov. 28, 1961, abandoned. Application for reissue Feb. 19, 1974, Ser. No. 443,774

Int. Cl.[2] C08G *18/63*

U.S. Cl. 260—2.5 BE 42 Claims

1. A method for preparing *elastic* polyurethanes comprising reacting

(A) a liquid, stable reactive polymer-polyol mixture *convertible to an elastic polyurethane product* having a viscosity of less than about 40,000 cps. at 10% polymer concentration and having a combining weight in a range yielding elastic [-to-rigid] polyurethane products, the essential components of said reactive mixture consisting of

(1) a substantial but minor amount of film forming polymer having a molecular weight of at least 5,000 and having a plurality of radicals containing active hydrogen atoms which are reactive with the —N=C=O radicals of an organic polyisocyanate

and

(2) a major amount of a solvent medium for said polymer consisting essentially of at least one normally liquid polyol essentially free from ethylenic unsaturation and having a molecular weight of at least about [500] *1000*, said polymer (1) being the polymerizate obtained by polymerizing, to a molecular weight of at least 5,000 and to a solids concentration of about 10% to about 50% by weight, an ethylenically unsaturated monomer in such polyol,

with

(B) an organic polyisocyanate to form such polyurethane, the ratio of the —N=C=O equivalents of (B) to the equivalents of reactive radicals of (A) being in the range of about 1–5 to 1.

23. A method for preparing cellular polyurethanes comprising reacting

(A) a liquid, stable reactive polymer-polyol mixture having a viscosity of less than about 40,000 cps. at 10% polymer concentration and having a combining weight in a range yielding elastic-to-rigid polyurethane products, the essential components of said reactive mixture consisting of

(1) a substantial but minor amount of film-forming polymer having a molecular weight of at least 5,000 and having a plurality of radicals containing active hydrogen atoms which are reactive with the —N=C=O radicals of an organic polyisocyanate, and

(2) a major amount of a solvent medium for said polymer consisting essentially of at least one normally liquid polyol essentially free from ethylenic unsaturation and having a molecular weight of at least about 500, said polymer (1) being the polymerizate obtained by polymerizing, to a molecular weight of at least 5,000 and to a solids concentration of about 10% to about 50% by weight, an ethylenically unsaturated monomer in such polyol, with

(B) an organic polyisocyanate to form such polyurethane, the ratio of the —N=C=O equivalents of (B) to the equivalents of reactive radicals of (A) being in the range of about 1–5 to 1, wherein mixture (A) and polyisocyanate (B) are reacted while in intimate admixture with a blowing agent to provide simultaneously reaction of said mixture (A) and polyisocyanate (B) and formation of cells in the polyurethane reaction product.

Re. 29,119
7-PYRIDINIUM METHYL CARBOXYL DERIVATIVES OF 7-AMINO-CEPHALOSPORANIC ACID

Hans Bickel, Binningen; Johannes Muller, Arlesheim, both of Switzerland; Rolf Bosshardt, deceased, late of Arlesheim, Switzerland, by Ruth Elisabeth Bosshardt-Schar, legal representative; Heinrich Peter, Binningen, and Bruno Fechtig, Reinach, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

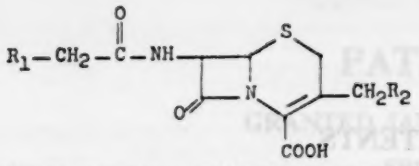
Original No. 3,757,013, dated Sept. 4, 1973, Ser. No. 76,283, Sept. 28, 1970. Application for reissue Sept. 18, 1975, Ser. No. 614,397

Claims priority, application Switzerland, Oct. 10, 1969, 15269/69

Int. Cl.[2] C07D *501/22, 501/34, 501/36*

U.S. Cl. 260—243 C 8 Claims

9. *A compound of Formula I*



in which R_1 represents an aminopyridinium radical substituted by lower alkyl and R_2 is hydrogen, hydroxyl, lower alkanoyloxy, halogeno-lower alkanoyloxy or monocyclic carbocyclic arylcarbonyloxy or -thiocarbonyloxy, monocyclic carbocyclic arylcarbonylmercapto or -thiocarbonylmercapto, unsubstituted or substituted by lower alkyl, lower alkoxy, lower alkylmercapto, halogen or nitro, or is an unsubstituted or N-lower alkyl, lower alkoxy-lower alkyl or halogeno-lower alkyl-substituted carbamoyloxy group or thiocarbamoylmercapto group.

PLANT PATENTS

GRANTED JANUARY 18, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,010

PLANT OF THE FERN FAMILY

Donald L. Biggers, Rte. 1, Box 107, Winter Garden, Fla. 32787

Filed Jan. 22, 1976, Ser. No. 651,538
Int. Cl.² A01H 9/00
U.S. Cl. Plt.—88 1 Claim

1. The new and distinct plant variety of the fern family substantially as herein described and characterized by a growth habit providing specimens during the sporophyte generation with a rosette arrangement of long, erect, robust, pinnately compound, mature fronds which have curly, relatively short pinnae that are inserted in a compact arrangement on a long, erect, robust and relatively thick rachis which is heavily endowed with hairs and basally merges with a stipe that is also heavily endowed with hairs, the stipe having a pair of longitudinally extending thin stripes which continue along the pinna insertions on the rachis and which in color are dominated during early frond maturity by reddish orange, brown, brownish orange, orange, yellowish brown, orange yellow and/or olive brown hues.

PATENTS

GRANTED JANUARY 18, 1977

ERRATA

For CLASS	See PATENT NO.
139–080	4,003,406
214–014	4,003,473
051–105 SP	4,003,721
062–078	4,003,728
062–093	4,003,729
429–199	4,003,753
429–149	4,003,754
429–178	4,003,755
429–219	4,003,757
264–119	4,003,758
202–241	4,003,802
202–262	4,003,803
427–311	4,004,026
358–083	4,004,078
358–256	4,004,079
358–128	4,004,080
358–128	4,004,081
358–141	4,004,082
358–125	4,004,083
358–133	4,004,084
340–324 AD	4,004,085
358–109	4,004,086
358–113	4,004,087
358–246	4,004,092
358–060	4,004,093
296–028	4,004,124
240–010.63	4,004,132
324–003	4,004,212
324–015	4,004,213
232–044	4,004,252

PATENTS

GRANTED JANUARY 18, 1977

PLANT PATENTS

ERRATA

GRANTED JANUARY 18, 1977

PATENTS

GRANTED JANUARY 18, 1977

NOTE—Cross reference listings of applications published under the first and second Trial Voluntary Protest Programs are located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

4,003,094

PANTYHOSE WITH SHAPING BAND FOR CHEEKY DERRIER RELIEF

Julie Newmar, 12 Beekman Place, New York, N.Y. 10022

Continuation-in-part of Ser. No. 509,080, Sept. 25, 1974, Pat. No. 3,914,799. This application Aug. 28, 1975, Ser. No. 608,549

The portion of the term of this patent subsequent to Oct. 28, 1992, has been disclaimed.

Int. Cl.² A41B 9/04

U.S. Cl. 2—409 **6 Claims**

1. Pantyhose for a female wearer and comprising:

a panty portion made of a stretchable knit fabric of a blend of nylon and elastomeric fibers, said fabric having a low degree of elasticity encircling the wearer's lower torso and having an elastic waist encircling band,

the panty portion including a rear panty portion which covers and confines the wearer's buttocks,

leg portions each depending from the panty portion and each arrangeable to receive one of the wearer's legs,

the pantyhose defining a crotch zone between the leg portions,

a shaping band attached to the rear panty portion centrally thereof and connected from the vicinity of the crotch zone to the vicinity of the waist band,

the shaping band having a high degree of elasticity substantially greater than that of the fabric of the panty portion,

the elasticity of the shaping band being sufficient to constrict the band into fitting engagement between the wearer's buttocks to produce cheeky relief.

4,003,095

TRISPHERICAL PROSTHETIC SHOULDER DEVICE

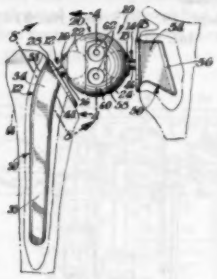
Anthony G. Gristina, Winston-Salem, N.C., assignor to Howmedica, Inc., New York, N.Y.

Filed Apr. 29, 1976, Ser. No. 681,805

Int. Cl.² A61F 1/24

U.S. Cl. 3—1.91 **10 Claims**

1. A trispherical prosthetic shoulder device comprising a relatively small ball-headed humeral component of a biocompatible metal, a humeral stem on the ball-headed humeral component for affixing it to the intermedullary canal of the humerus, a humeral flange separating the ball-headed component from the stem, a ball-headed scapular component of a biocompatible metal, a scapular stem on the scapular component for attaching it to the scapular region of the shoulder, a scapular flange separating the scapular ball from the scapular stem, a spheroidal ball-capturing member having a pair of spherical sockets disposed substantially 180° from each other, the ball-capturing member comprising a pair of biocompatible cutout plastic hemispheres sharing the sockets between them,



and clamping means joining the hemispheres together whereby the ball-heads are rotatably trapped in the sockets to provide a substantially stable shoulder prosthesis with a substantially wide range of movement.

4,003,096

WRIST JOINT ENDOPROSTHESIS

Otto Frey, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed May 24, 1976, Ser. No. 688,995

Claims priority, application Switzerland, June 17, 1975, 7807/75

Int. Cl.² A61F 1/24

U.S. Cl. 3—1.91 **6 Claims**

6. A wrist joint endoprosthesis comprising

a proximal joint part adapted for anchoring in a forearm and including an extension having a pair of parallel side walls;

a distal joint part adapted for anchoring in at least one metacarpal bone and including a spherical joint head having at least one extension projecting therefrom; and

an intermediate member between said joint parts having a spherical socket at one end receiving said joint head, a groove within said socket receiving said extension of said joint head to prevent rotation of said joint head about an axis longitudinal of said distal joint part, and a slot-like V-shaped recess at an opposite end receiving said exten-

sion of said proximal joint part, said recess having a pair of parallel side walls in the plane of said groove to guide said side walls of said joint extension.

4,003,097

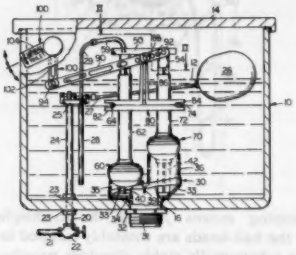
TWO LEVEL FLUSH TANK VALVE MECHANISM

Harold M. Book, 7730 Wildwood Road, P.O. Box No. 361, Findlay, Ohio 45840

Filed Sept. 19, 1975, Ser. No. 614,751

Int. Cl.² E03D *1/14*

U.S. Cl. 4—67 A **25 Claims**



1. A valve mechanism for draining liquid from a tank having two vertically spaced drain levels, comprising:

A. a tank having an outlet means at each of said levels,

B. a guide means mounted in said tank for each said outlet means,

C. a movable valve normally closing each outlet means, each valve having an overflow tube connected thereto, each said valve and over flow tube being guided for vertical movement along each said guide means,

D. a fulcrum pivot mounted on each said overflow tube,

E. a rocking lever having opposite ends journalled in said fulcrum pivots, and having an offset intermediate link pivot, and

F. a push-pull link attached to said link pivot for opening one valve while holding the other closed, and vice versa.

4,003,098

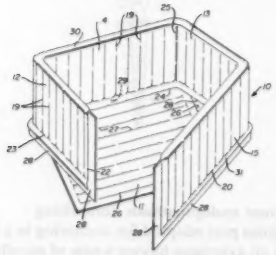
INFLATABLE CRIB

Leonard Fink, 7868 Southern Blvd., Youngstown, Ohio

Filed Nov. 10, 1975, Ser. No. 630,740

Int. Cl.² A47D *7/00*

U.S. Cl. 5—93 R **6 Claims**



1. An inflatable structure in the form of a baby's crib having a base portion and vertical side walls attached to the outermost edges thereof and in communication therewith, an opening in said inflatable structure and an air valve in said opening, said base portion having a plurality of longitudinally extending heat sealed seams therein terminating substantially inwardly of the ends and sides thereof so as to define a plurality of air passageways therebetween and communicating air passageways at the ends and sides thereof together with a peripheral flap therearound, a plurality of secondary heat sealed seams in said side walls terminating substantially inwardly of the upper and lower edges thereof so as to define continuously extending enlarged inflatable upper and lower rolled edge portions on said side walls and a plurality of inflatable interconnecting areas therebetween and flaps extending outwardly thereof, said flaps on said enlarged lower rolled edge portions of said side walls continuously joined to said peripheral flap around said base portion so that said vertical side walls are located inwardly of the outermost sections of said enlarged lower rolled edge portions thereof.

4,003,099

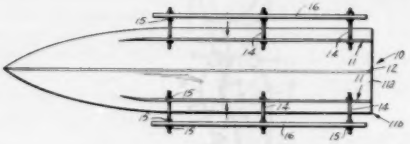
BOAT HULL WITH GRAB RAILS ON ITS UNDERSIDE

Stephen Hivko, 1001 Hazelwood Ave., Middlesex, N.J. 08846

Filed Nov. 25, 1975, Ser. No. 635,145

Int. Cl.² B63B *17/00*

U.S. Cl. 9—1.6 **2 Claims**



1. A safety device for a boat, comprising in combination, a pair of parallel, longitudinally running spaced apart tubes which serve as grab rails for the occupants of a capsized boat, a pair of longitudinally extending runners formed on the underside of the hull of said boat, one tube and one runner being located on each side of the keel of the boat hull, a plurality of parallel, spaced apart rods being threaded at each end, the rods extending through said tubes and being slideably supported in transverse openings through said runners, each rod being secured to a runner by means of a nut fastener threadably attached to one end of the rod and in abutting relationship with the runner to prevent disengagement of the rod from the runner, each rod being secured to a tube by means of nut fasteners, one abutting each side of the tube, and being threadably attached to the other end of the rod.

4,003,100

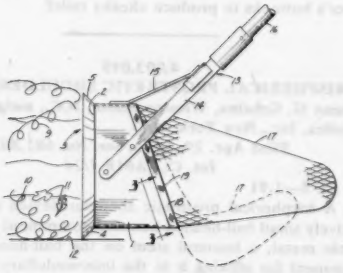
POOL CLEANING DEVICE

James L. Whitaker, 1420 NE. 16th Terrace, Fort Lauderdale, Fla. 33304

Filed Jan. 15, 1975, Ser. No. 541,119

Int. Cl.² E04H *3/20*

U.S. Cl. 15—1.7 **4 Claims**



1. In a pool cleaning device of the class described, in combination, a hollow rectilinear body of thin sheet material constructed to be moved through water whilst submerged therein, and having provision for water passage therethrough, flat

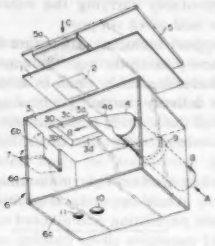
angular lips extending around the opening, the lips being divergently angularly positioned with respect to the body and forward end thereof, and of sufficient extent whereby to create a rolling current at said end, cause light foreign materials affected thereby to be moved upwardly from the surface upon which they are resting and pass into the body and a collecting member attached thereto whilst said body is moved as stated, the rear end of the body having means to attach a collecting member thereto, a bag-like collecting member of flexible formainous material connected to the rear end of the body so as to trail therebehind when the body is moved in the direction of the forward end, said member being of sufficient length whereby to collapse over and close the said rear end when the body is at rest and moved in the direction of said end, to retain foreign materials collected in the member, and means to move said body.

4,003,101

APPARATUS FOR DRYING FILMS

Eiichi Saito, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Tokyo, Japan

Filed Jan. 27, 1976, Ser. No. 652,749
Claims priority, application Japan, Jan. 31, 1975, 50-14322
Int. Cl.² G03D *15/02*
U.S. Cl. 15—303 **8 Claims**



1. A drying apparatus for drying the surface of a film comprising:

a film support member having a rectangular aperture of the size substantially smaller than the size of the film to be dried, said aperture being defined by four side edges and put into contact with the surface of the film to be dried, said side edges being slanted to extend from the outer surface of the film support member down to the surface of the film located in contact with the support member at an angle not larger than 45° with respect to the surface of the film, and

a compressed air supplying means provided above the film support member for supplying an air blow in a direction parallel to two opposite side edges of the aperture to provide a uniform pressure distribution over the surface of the film along the lateral dimension thereof.

4,003,102

DOOR AND WINDOW CLOSER

Nathaniel L. Hawks, and John R. Shively, both of Albany, Calif., assignors to Elmer E. Jones, Oakland, Calif.

Filed Aug. 7, 1975, Ser. No. 602,731
Int. Cl.² E05F *1/02, 1/08*
U.S. Cl. 16—72 **6 Claims**

1. A closer apparatus for a movable panel having a first closed position covering a portion of a framed opening and a second open position uncovering a portion of said opening comprising:

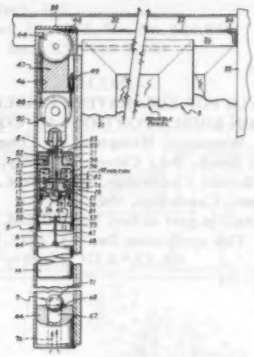
a. motor means connected to said frame and movable panel and biasing said movable panel to said first closed position; and said motor means includes a weight mounted for substantially vertical reciprocating travel and connected to said piston for travel therewith;

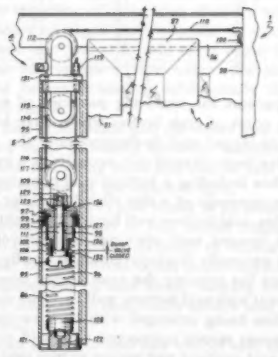
b. a pneumatic cylinder forming a compression chamber;

c. a piston formed with a passage therethrough and mounted for slidable movement within said cylinder and operatively connected to said movable panel for compressing air within said chamber;

d. check valve means permitting the inlet of air to said compression chamber of said cylinder upon movement of said panel from said first closed position to said second open position and blocking passage of air upon movement of said panel to said closed first position;

e. air restriction means regulating the escape of compressed fluid from said chamber;





f. an override valve means mounted on said piston having a first position out of sealing contact with said fluid passage through said piston permitting flow of fluid therethrough from said chamber when said panel is forced to close at a rate faster than the normal closing of said panel by said motor means and a second position in substantial sealing engagement with said fluid passage in said piston and said override valve means includes a valve plate having a valve seat at one end formed for sealably mating with a valve seat on said piston;

g. means biasing said override valve means to said first open position;

h. force means normally overcoming said biasing means

during movement of said panel from said second to said first position thereby forcing said override valve means to said second position in substantial sealing engagement with said piston passage;

i. said valve plate is formed with openings which are in communication with said compression chamber and said passage through said piston in said first position of said override valve means and out of communication with said passage through said piston in said second position of said override valve means; and

j. said motor means includes a connection cable operably connected at one end to said frame and has a connection member on the other end operably connected to said piston.

4,003,103

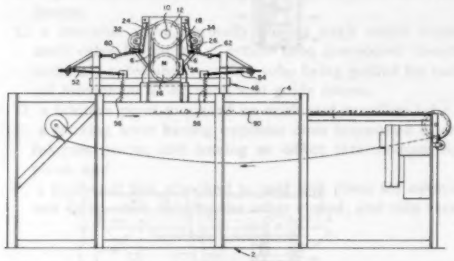
APPARATUS FOR SEPARATING EDIBLE CRAB MEAT FROM NON-EDIBLE PORTIONS OF COOKED CRABS

Richard T. Wenstrom, Hampton, Va.; Theodore S. Reinke, Rehoboth Beach, Del.; Calvert B. Tolley, Wingate, and J. Clayton Brooks, Cambridge, both of Md., assignors to Sea Savory, Inc., Cambridge, Md.

Continuation-in-part of Ser. No. 457,554, April 3, 1974, abandoned. This application Dec. 23, 1975, Ser. No. 643,706

Int. Cl.² A22C *29/00*

U.S. Cl. 17—71 **8 Claims**



1. Apparatus for removing particles of edible crab meat from the cores of crab bodies which have been cooked, deshelled, de-legged and de-fingered and the body cavities of which have been cleaned out, comprising a generally horizontal core box including a bottom wall containing a plurality of discharge openings of a size slightly smaller than that of the crab bodies, said bottom wall having a plurality of pockets that converge toward said openings, respectively, said pockets having a generally frustopyramidical configuration, resilient pad means for pressing the crab bodies downwardly in tight engagement with said bottom wall opposite said openings, said crab bodies being arranged with their cavities facing downwardly, cover means connected with said core box for compressing said resilient pad means to bias said crab bodies into engagement with said bottom wall, means for vibrating said core box between 1500 and 5000 vibrations per minute, thereby to shake the edible crab meat from the crab bodies, said vibrating means including a core box holder, and connecting means removably connecting said core box with said core box holder, and wherein said resilient pad means comprises a plurality of resilient pads associated with said openings, respectively; wherein said cover means comprises an inverted tray-shaped cover member having top and downwardly depending side and end walls adapted for cooperation with said core box to define an assembly in which the resilient pad means are compressed between said cover member and said core box; and further wherein said connecting means comprises spaced opposed channel means for slidably receiving corresponding sides of said assembly.

4,003,104

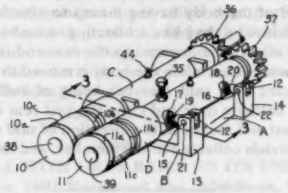
COILER CALENDER ROLLS

Wilburn J. Gunter, 315 Virginia Ave., Greenwood, S.C. 29646

Filed Apr. 23, 1975, Ser. No. 570,620

Int. Cl.² D01G *25/00*

U.S. Cl. 19—150 **6 Claims**



1. A calender roller apparatus for handling textile slivers in sliver coilers comprising:

a. a base member carrying a pivot support;

b. a pair of roller assemblies having surface engaging coiler rollers rotatably carried thereon with parallel center lines between which said sliver is passed for delivery;

c. one of said roller assemblies being fixedly mounted to said base member;

d. means for pivotably carrying the other of said roller assemblies on said pivot support;

e. said pivot support including a fulcrum located above a horizontal plane passing through the center of said pivotably carried roller assembly when in an operational position for sliver delivery providing a biasing force opposing the tendency of the pivoted roller assembly to flip up and for properly compressing the sliver held between the coiler rollers;

f. said biasing force effectively maintaining said pivoted roller assembly in said operational position at high speed operation while permitting said pivoted roller assembly to release should excessive sliver buildup occur beneath or around said coiler rollers; and

g. said pivot support including at least one support member extending vertically above the center line of said pivoted roller assembly with said fulcrum located adjacent an upper end thereof, and said means for carrying said pivoted roller assembly including an adjustable linkage means connected between said support and said pivoted roller assembly to adjust the distance therebetween.

4,003,105

APPARATUS FOR TRANSFORMING AN AIR-FIBRE DISPERSION STREAM IN THE MANUFACTURE OF HOMOGENEOUS FIBROUS MATERIALS

Alexandr Evgenievich Guschin, Kovensky pereulok, 13, kv. 18; Alexandr Andreevich Khokhryakov, Institutsky prospekt, 9, kv. 62; Evgeny Yakovlevich Pechko, Krasnoe selo, Fabrichny poselok, 4, kv. 7; Konstantin Ivanovich Obraztsov, prospekt Parkhomenko, 6, kv. 68; Anatoly Vasilievich Konstantinov, Svetlanovsky prospekt, 21, kv. 46, and Vyacheslav Sergeevich Alexandrov, ulitsa Nezhinskaya, 4, kv. 123, all of Leningrad, U.S.S.R.

Filed Sept. 15, 1975, Ser. No. 613,511

Int. Cl.² D01G *25/00*

U.S. Cl. 19—155 **1 Claim**

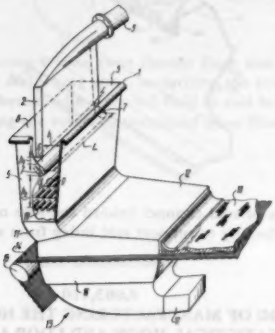
1. An apparatus for transforming an air-fibre dispersion stream, comprising:

a. a chamber having an elongated cross-section defined by a pair of opposed side walls and a pair of opposed elongated parallel front and back walls connecting said side walls, and having at least one open end;

b. a slot nozzle having an elongated slot opening and disposed within said chamber for injecting a dispersion stream into said chamber, said slot nozzle being positioned with its slot opening generally parallel to the elon-

gated front and back walls of said chamber and facing the open end of said chamber;

c. an elongated body having a length at least equal to a length of the elongated slot opening and disposed with said chamber opposite said slot opening and substantially parallel thereto, said elongated body having a generally cylindrical cross section with a diameter at least 1.2 times a width of the slot opening and opposite the slot opening for dispersing the dispersion stream throughout the chamber in use, wherein said elongated body is spaced from the slot opening about 0.3 to about one diameter of the generally cylindrical cross section thereof; and



d. means defining a spatial lattice across a cross section of said chamber downstream from the slot opening at a distance equal to from about two to about six diameters of said elongated body for smoothing the flow of the dispersion dispersed throughout said chamber and flowing out of said at least one open end.

4,003,106

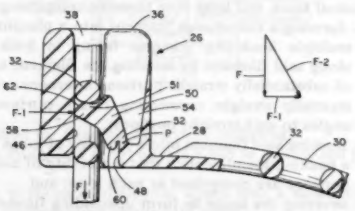
LADDER STRAP CABLE TIE WITH PIVOTAL DOG

Charles G. Schumacher, Tinley Park, and Robert E. Dravec, Palos Heights, both of Ill., assignors to Panduit Corporation, Tinley Park, Ill.

Filed June 19, 1975, Ser. No. 588,273

Int. Cl.² B65D *63/00*

U.S. Cl. 24—16 PB **12 Claims**



1. A self-locking cable tie for forming a plurality of elongate objects such as wires into a bundle comprising:

an elongate strap including a pair of spaced longitudinally extending side rails joined by a plurality of spaced transverse rungs;

a head extending from adjacent one end of said strap and including a strap entry face, a strap exit face and a strap-receiving aperture extending between said faces;

a locking dog for holding said strap formed of a material having greater strength in compressive loading than in shear loading per unit cross-sectional area and sequentially engagable with said rungs, said dog including a flexible nec!. pivotally joining said dog to said head and resiliently biasing said dog to extend between adjacent rungs of said strap, said dog further including a free end portion comprising positioning means which comprises a saddle surface in spaced facing relationship with said strap exit face for cradling the rung to be held; and

limiting means for limiting pivotal movement of said dog towards said strap entry face after application of a strap withdrawal force so that the major component of said force is directed through said dog from said free end portion to said neck whereby after application of the strap withdrawal force, said dog securely holds said strap and the dog is predominantly in columnar loading.

4,003,107

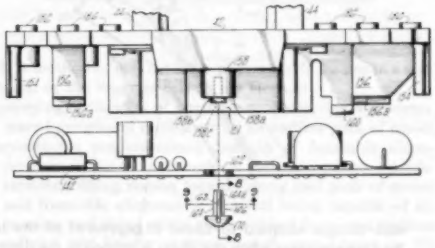
ONE PIECE PLASTIC PIN FASTENER

Keith William Klein, Simsbury, and Joseph Michael Palmieri, Southington, both of Conn., assignors to General Electric Company, New York, N.Y.

Filed Oct. 22, 1975, Ser. No. 624,849

Int. Cl.² A44B *21/00*

U.S. Cl. 24—73 P **15 Claims**



1. A one-piece plastic pin fastener comprising, in combination:

A. an elongated shank of T-shaped cross-section consisting of

1. a flexible, normally straight cross beam arranged transversely to the direction of elongation of said shank, and
2. a loading beam arranged perpendicular to said cross beam with one end joined to said cross beam at substantially the mid-length of the latter, the junction between said beams extending substantially the full length of said shank,
3. the ends of said cross beam and the other end of said loading beam each providing smooth, uninterrupted bearing surface extending from one end of said shank along a major portion of the shank length,
4. whereby, upon insertion of said shank in an undersized bore, said bearing surfaces of said beams engage the bore sidewall causing said cross beam to buckle along its length, said buckled cross beam achieving forceful frictional engagement of said beam bearing surfaces with the bore sidewall to removably secure said shank in the bore, and

B. an enlarged head joined to said one end of said shank.

4,003,108

SLIDER FOR SLIDE FASTENERS

St-Onge, Georgette G., 325 Sauve St., W., Apt. 5, Montreal, Quebec, Canada (H3L 1Z6)

Filed Aug. 11, 1975, Ser. No. 603,273

Int. Cl.² A44B *19/28*

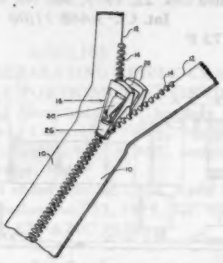
U.S. Cl. 24—205.15 E **1 Claim**

1. A slider for slide fasteners of the type having interlocking elements attached to opposed stringers comprising:

a. an upper and lower member superposed over each other, each member having, at one end, a jaw portion for slidingly receiving the interlocking elements of a slide fastener, and, at the other end, a handle portion, both said portions being separated by a transverse pivot axis piv-

oted on and across the side of the members facing each other for allowing a rocking action of one member over the other, the handle portions being provided with an aperture, each aperture facing each other,

b. a spring for maintaining said members into a superposed position and for resiliently urging the jaw portions towards each other and in a position for overlapping the said interlocking elements, the facing sides of said members corresponding to said handle portions tapering away from the said pivot axis so that when the handle portions are manually urged together, the jaw portions spread apart to release the interlocking elements, the said spring being V-shaped, the apex of said spring being aligned with the said apertures and both legs of said spring extending over both jaw portions, the free end of said legs grippingly engaging said jaw portions to urge the latter together, each jaw portion comprises a guide plate provided with



side flanges adapted to cause engagement of the interlocking elements when the slider is moved in the direction of the handle, and a wedge shaped member secured to the rear of the said guide plates facing each other and along the median line passing therethrough, the said wedge shaped member adapted to disengage the interlocking elements when the slider is moved in the direction of the jaw portions, the said upper and lower members being provided, on their side facing each other, with two spaced lateral walls rearwardly of said wedge shaped members, wherein the paths defined by the guide plates, the side flanges, the wedge shaped members and the said lateral walls have an angle of about 25° ± 5°,

whereby a constant manual pressure exerted on said handle portions towards one another will cause a continuous and progressive opening of said jaw portions and permit disengagement of the slider from the interlocking elements.

4,003,109

CASKET LINING MEANS

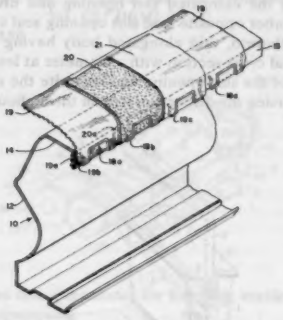
William Matichak, 424 Delaware St., Peckville, Pa. 18452

Filed May 16, 1975, Ser. No. 578,233

Int. Cl.² A61G *17/00*

U.S. Cl. 27—19 **11 Claims**

1. In a casket structure; a case including a side wall defining a portion of the case, an upper edge portion of said side wall having an inwardly directed, generally horizontal flanging which terminates in a lip which depends within the case and has a forward side facing away from said wall; a lining secured to said lip and having an edge portion folded to form an elongate lining channel, one side of which extends along and faces one side of said lip, and the other side of which extends along and faces the opposite side of said lip; and detachable means securing said lining channel to said lip, said means comprising a plurality of resilient fasteners spaced along said lip, each fastener having portions straddling said lip and in engagement with the two sides of said lining channel and forcing each of



the sides of said channel toward the side of the lip which it faces, whereby to support said lining from said lip.

4,003,110

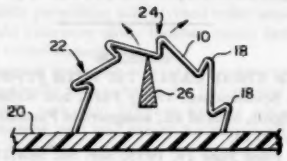
METHOD OF MANUFACTURING THE HOOK PORTIONS OF A STATISTICAL HOOK AND LOOP AREA FASTENER

Robert A. Bennett, Easton, Conn., assignor to Robert A. Bennett, Easton and Mattern, Ware, Davis and Stoltz, Bridgeport, both of, Conn., part interest to each

Continuation of Ser. No. 424,221, Dec. 13, 1973, abandoned, Division of Ser. No. 213,464, Dec. 29, 1971, Pat. No. 3,778,870. This application Feb. 24, 1975, Ser. No. 552,291

Int. Cl.² D06C *13/08*; D02G *1/14*

U.S. Cl. 28—72 P **6 Claims**



1. The method of manufacturing the hook portions of a statistical hook and loop area fastener comprising:

A. forming a continuous filament into a plurality of zigzag multiple hook-like portions facing in both directions along said filament by bending the filament into a series of substantially straight portions interconnected by substantially straight connecting return portions at acute angles to said straight portions;

B. forming said filament into a plurality of loops attached to a backing member such that a plurality of said hook-like portions are comprised in each loop; and

c. severing the loops to form upstanding filaments bearing said hook-like portions.

4,003,111

PROCESS FOR PREPARING A TEXTURIZED GLASS FIBER STRAND

Warren W. Drummond, Allison Park, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

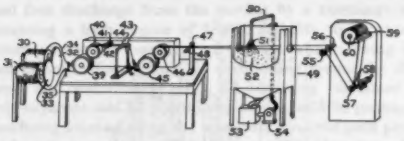
Filed Dec. 3, 1975, Ser. No. 637,345

Int. Cl.² D02G *1/20*, *1/16*

U.S. Cl. 28—72.11 **8 Claims**

1. A process for preparing a texturized glass fiber containing strand comprising feeding a glass fiber strand from at least one forming package to a zone of fluid turbulence, passing the strand through said zone of fluid turbulence while passing

fluid in said zone at high speed in a circumferential direction around the zone and perpendicular to the path of travel of the strand to thereby introduce a false twist into the strand, passing the strand having a false twist therein from said zone of turbulence into a texturizing zone, texturizing the strand having a false twist therein with a second fluid in said texturizing zone and collecting the resulting texturized glass fiber strand.

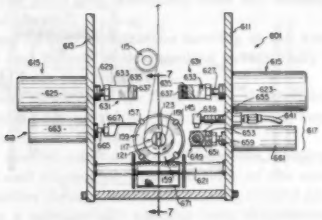


4,003,112

AUTOMATIC CAPACITOR WINDING MACHINE AND METHOD

Fredric S. Miller; Armando A. De Mauro, both of Wayne, N.J., and Robert James Delvy, Bridgeport, Conn., assignors to Universal Manufacturing Corporation, Paterson, N.J.

Filed Mar. 25, 1975, Ser. No. 562,012
Int. Cl.² H01G 4/16
U.S. Cl. 29—25.42 **30 Claims**



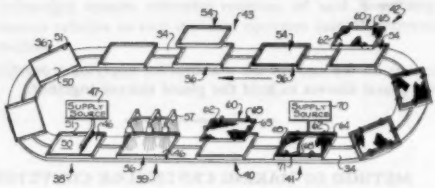
1. A method for winding capacitors including:
moving a bifurcated arbor having a slot to a retracted position;
clamping portions of dielectric layers into a substantially planar configuration above said arbor;
retracting said arbor;
rotating said arbor so that its slot is substantially in alignment with the plane of said dielectric layers;
carrying the planar portion of said dielectric layers into alignment with the axis of said arbor;
maintaining said alignment while extending said arbor axially to an advanced position to grasp said dielectric layers;
rotating said arbor to wind the capacitor;
feeding electrodes from continuous supplies to said rotating arbor;
supplying a relatively thick structural insert while said capacitor is being wound to reinforce the capacitor;
moving said arbor to a retracted position while stripping said capacitor off said arbor.

4,003,113

METHOD OF FORMING A SPRING CUSHION CONSTRUCTION

Carl Gordon Bulloch, Jr., 31 Kingwood Place, Asheville, N.C. 28804

Division of Ser. No. 478,618, June 12, 1974, Pat. No. 3,906,560, which is a continuation-in-part of Ser. No. 298,953, Oct. 19, 1972, Pat. No. 3,818,560, which is a division of Ser. No. 130,328, April 1, 1971, Pat. No. 3,719,963. This application May 5, 1975, Ser. No. 574,598
Int. Cl.² B68G 7/00; B29D 3/00
U.S. Cl. 29—91.1 **18 Claims**



14. A method of making foam pads suitable for use in a seat, mattress, or the like comprising the steps of
conveying a plurality of open top molds having a predetermined peripheral outline about an endless path of travel,
depositing a predetermined quantity of foamable elastomeric material in each mold as the same passes a predetermined filling station located along said path of travel, said foamable elastomeric material being capable of expanding and rising within the mold and forming a resilient cellular pad having a dense, tough upper crust on the upper surface thereof which is in contact with the surrounding air,
positioning an openwork mold insert on the upper surface of the foaming material in each mold so as to be substantially floatingly carried thereon as the mold passes a predetermined assembly station located downstream of said filling station, said mold insert having a generally planar lower surface and a peripheral outline somewhat smaller than that of said open top mold such that a relatively narrow open channel is defined between the mold and mold insert, and wherein said mold insert is free to rise upwardly with the foaming material and serves to level the underlying portion of the upper surface while permitting air to contact a significant portion of the same to thereby result in a dense upper crust being formed thereon,
depositing additional foamable material in the open channel of each mold as the mold passes a predetermined edge forming station located downstream of said assembly station to thereby form a raised foam edge along the periphery of said upper surface, and
removing the resulting pad from the mold and mold insert at a removal station located downstream of said edge forming station.

4,003,114

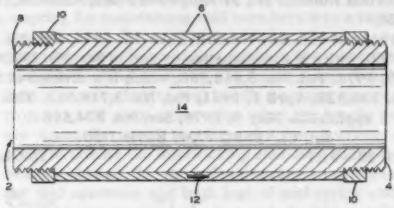
COMPRESSIBLE SLEEVE EMBOSSING ROLL

Walter J. Lewicki, Jr., and Jacob A. Otthofer, Jr., both of Lancaster, Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Filed Feb. 25, 1976, Ser. No. 661,279
Int. Cl.² B21B 31/08
U.S. Cl. 29—125 **4 Claims**

1. An embossing roll which is composed of a hollow material mandrel having means therethrough to permit the passage of a cooling fluid and a plurality of sleeves pressed on the outer surface thereof, said sleeves being of a material having a higher thermal conductivity and higher thermal expansion

than the material of the mandrel, pins locking together adjacent sleeves to prevent relative movement thereof and locking



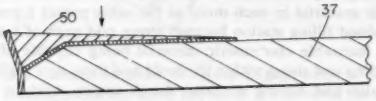
means on the ends of the mandrel for applying a pressure to the plural sleeves to hold the plural sleeves together.

4,003,115

METHOD OF MAKING CENTRIFUGE CONVEYOR

William F. Fisher, Walpole, Mass., assignor to Bird Machine Company, Inc., South Walpole, Mass.

Filed Sept. 25, 1975, Ser. No. 616,632
Int. Cl.² B21K *3/04*; **B23P** *15/02, 15/04*
U.S. Cl. 29—156.8 R **6 Claims**



1. The method of providing a hard wear-resistant outer forward edge on at least a portion of a blade of a helical bladed centrifuge conveyor which comprises

securing to a blade of said conveyor a band of metal having an upstandjng marginal portion thereof extending beyond the forward face of said blade adjacent its outer edge to form with said forward face a cavity, said band defining the outer margin of said cavity,

fusing a wear-resistant material at elevated temperature into said cavity to bond said material to said band and to said blade and to fill said cavity to the desired depth with said bonded wear-resistant material forming a portion of the forward face of said blade.

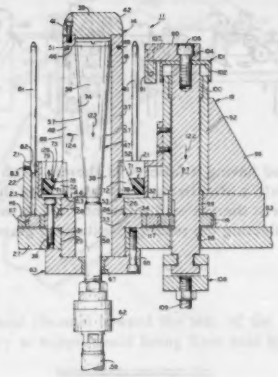
4,003,116

APPARATUS FOR SETTING INSULATORS AND PRESSING END TURNS

Richard W. Bale, Fennville, Mich., assignor to General Electric Company, Fort Wayne, Ind.

Filed July 7, 1975, Ser. No. 593,491
Int. Cl.² H02K *15/00*
U.S. Cl. 29—734 **5 Claims**

1. Apparatus for use in performing operations on stator assemblies that comprise a magnetic core having an axially extending bore and axially extending winding accommodating slots, winding turns having end portions and also having portions supported in at least some of the slots, and wedges overlying at least some coil turn portions in at least two of the slots, the apparatus comprising: a driving member; means for moving at least one wedge along a core slot in a generally radial direction relative to the bore of the core; and means for shaping end portions of a plurality of winding turns; said means for moving and means for shaping both being driven to operative position by the driving member; said means for shaping end portions including at least one driven section; the means for moving at least one wedge including at least one elongate member having at least one driven portion and at least one driving portion, with said driving portion being drivingly en-



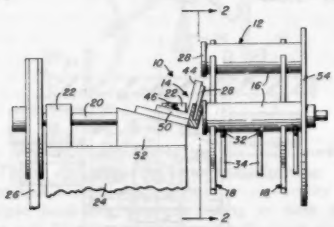
gageable with the at least one driven section; and the driving member being engageble with the at least one driven portion.

4,003,117

OVERCAPPING APPARATUS

Wade D. Fletcher, and Jerry F. Sansbury, both of Hartsville, S.C., assignors to Sonoco Products Company, Hartsville, S.C.

Filed Mar. 9, 1976, Ser. No. 665,337
Int. Cl.² B67B *3/22*; **B65B** *7/28*; **B23P** *19/02*
U.S. Cl. 29—809 **3 Claims**



1. Overcapping apparatus for the application of flexible lids to the ends of horizontally oriented elongated flexible cylindrical containers, said apparatus comprising container carrying means for horizontally receiving and carrying elongated containers along a vertical arcuate path; container feeding means for introducing containers to said container carrying means; lid positioning means for sequentially generally vertically orienting lids in the path of the ends of moving containers for engagement therewith and thereon; and lid feeding means for introducing lids to said lid positioning means; said container carrying means comprising a pair of spaced vertically oriented wheels with multiple pockets defined about the periphery of each wheel, each pocket having a horizontally aligned companion pocket on the other wheel for simultaneous seating of a horizontal container, means for rotating said wheels simultaneously about a common horizontal axis whereby the pockets on each wheel describe a circular vertical path including an upwardly directed path portion during which containers are engaged within said pockets and raised from the container feeding means, and a downwardly directed path portion during which containers are gravity discharged from said pockets,

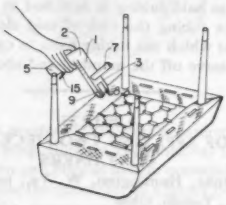
said pockets opening forwardly in the direction of rotation of said wheels, each pocket being arcuate and of an extent so as to encircle approximately, but no more than, one half the circumference of a cylindrical container to maintain free entry to and free discharge from the pocket by a container while maintaining a high degree of lateral stability to a container received within the pocket, one of said wheels being positioned closely adjacent said lid positioning means for direct support and stabilization of a lid receiving container end closely adjacent said lid positioning means, said lid positioning means being located along the upwardly directed path portion of said pockets, and a vertically orientated backup laterally of and parallel to the wheel remote from said lid positioning means.

4,003,118

HOG STAPLE GUN

George W. Jensen, Pensacola, Fla., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Mar. 11, 1976, Ser. No. 666,129
Int. Cl.² B23P *11/00*
U.S. Cl. 29—243.56 3 Claims



1. A hog staple gun, comprising

a flat barrel-type housing having spaced opposite first and second ends and an axial chamber formed therethrough, extending between said ends and opening at the second end of said housing;

a pistol-type hand grip extending from the housing at the first end thereof;

a feed bore formed through the housing in the area of the second end thereof and extending substantially perpendicularly from the chamber;

guide means mounted in the feed bore and extending out of the housing for movably guiding a stack of hog staples individually into the chamber;

a pair of curved arms extending from the housing at the second end thereof on opposite sides of the opening of the chamber thereat, said arms curving toward each other to form a substantially circular area therebetween and having free ends spaced from each other; and

feed means operated by a holder of the gun for moving a single staple at a time from the guide means in the chamber at the feed bore through the chamber and the opening at the second end of the housing into contact with the arms whereby said arms form a substantial circle of each staple.

4,003,119

PULLING DEVICE

Melvin Dong Hugh, Wilmington, Calif., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Jan. 16, 1976, Ser. No. 649,851
Int. Cl.² B23P *19/04*
U.S. Cl. 29—254 6 Claims

1. A pulling device comprising:

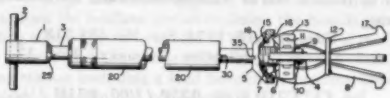
a mandrel having a handle for gripping said pulling device;

a gripping jaw mounting means securely fastened to one end of said mandrel;

adjustable gripping jaws mounted on said gripping jaw mounting means;

adjustment means for said jaws threadably mounted for rotation on said mandrel;

impacting means slidably mounted on said mandrel for imparting an impact to said mandrel; and



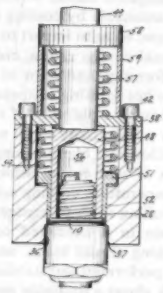
coupling means between said adjustment means and said impacting means whereby rotation of said impacting means relative to said mandrel operates said adjustment means.

4,003,120

CAPTIVE TYPE SPARK PLUG GASKET AND TOOL FOR INSTALLING SAME

Harold P. Hopp, 35 Industrial Road, Lodi, N.J. 07644

Filed July 8, 1975, Ser. No. 593,985
Int. Cl.² B25B *27/14*
U.S. Cl. 29—278 5 Claims

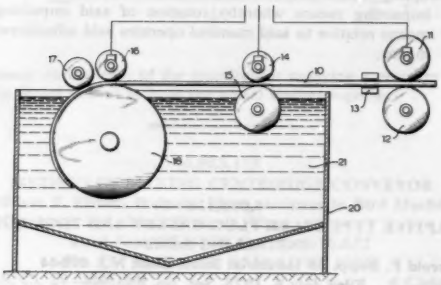


1. In a combination spark plus and captive gasket therefor, in which said spark plug includes a plug body having a threaded shank extending outwardly along the principal axis of said plug from a main body, said threaded outer shank including an undercut area adjacent said main body, said gasket including a plurality of mutually compressible flanges and a locking flange lying in a curved plane and extending inwardly of said compressible flanges to be engaged within said undercut area, said locking flange having a free and generally arcuate edge, said threaded shank having a given pitch and defining a continual spiral recess between adjacent convolutions of said thread, the improvement comprising: said arcuate free edge of said locking flange being bent out of said curved plane, whereby the effective thickness of said edge is substantially greater than the thickness of metal forming said locking flange; said locking flange upon being compressed during installation of said plug and gasket with a threaded spark plug opening being deformed to lie in a plane perpendicular to said principal longitudinal axis of said spark plug wherein the bent portion of said arcuate free edge is reduced in diameter to substantially correspond to the diameter of said undercut area, said bent portion being substantially continuous and lying at least partially in a curved plane intersecting the plane of said locking flange, the effective thickness of said bent portion providing sufficient rigidity to said locking flange to prevent cross-threading thereof with said spiral recess upon the disengagement of said plug from said threaded opening.

4,003,121
METHOD AND ARRANGEMENT FOR THE PRODUCTION OF ANNULAR ARTICLES

Albert Hagen, Dortmund; Theodor Kaiser, Hagen-Emst, and Heinz Pohler, Herdecke-Kirchende, all of Germany, assignors to Hoesch Werke Aktiengesellschaft, Dortmund, Germany

Filed July 15, 1974, Ser. No. 488,718
Claims priority, application Germany, July 17, 1973, 2336281
Int. Cl.² C21D *9/40*; B23P *17/00*; B21H *1/12*
U.S. Cl. 29—415 **10 Claims**



1. A method of making ring-shaped articles, comprising hot-forming an elongated blank, which is in an unhardened condition and is hardenable by cooling from a predetermined elevated temperature, so as to impart to said blank a predetermined cross-sectional configuration; coiling said blank subsequent to said hot-forming, and prior to substantial cooling of said blank from the hot-forming temperature, so as to produce a coiled element having a plurality of convolutions of predetermined diameter substantially equal to the desired diameter of the finished articles, said blank having a temperature subsequent to initiation of said coiling which at least equals said predetermined temperature; cooling said blank subsequent to initiation of said coiling so as to harden said blank and obtain said coiled element in a hardened condition, said cooling comprising quenching of said blank, and said coiling and said quenching being performed substantially simultaneously by bending said blank about a rotatable member which is at least partially immersed in a quenching medium and which guides said blank into the same; and subdividing said coiled element subsequent to said quenching so as to produce from each of at least some of said convolutions a substantially annular article.

4,003,122
APPARATUS AND METHOD FOR APPLYING FILTER TO A DRAINAGE TUBING

Richard C. Overmyer, Francesville, and Mario Guerra, Indianapolis, both of Ind., assignors to Francesville Drain Tile Corporation, Francesville, Ind.

Filed Dec. 29, 1975, Ser. No. 645,254
Int. Cl.² B23P *19/00*, *19/04*
U.S. Cl. 29—429 **13 Claims**

1. Apparatus for applying filter cloth or the like to a continuous length of flexible drainage tubing as the same is being installed in the ground, comprising

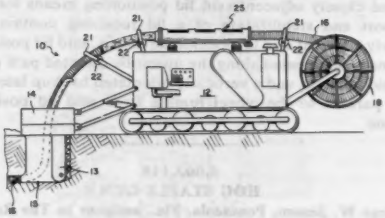
an installation machine having a tube-laying boot,

means for supplying a continuous length of flexible drainage tubing to the machine,

filter-cloth dispensing means mounted on the machine and including a tubular mandrel of a size and mounted in position to pass the drainage tubing therethrough as it progresses from the supply means to the tube-laying boot,

a long sleeve of filter cloth or the like gathered and packed on the mandrel so that by attaching the end of the sleeve to the tubing passing through the mandrel the sleeve will be drawn off the mandrel onto the tubing,

and feed-controlling means at the end of the mandrel at which the sleeve is drawn off, for controlling the rate at which the sleeve is drawn off from the mandrel onto the tubing.

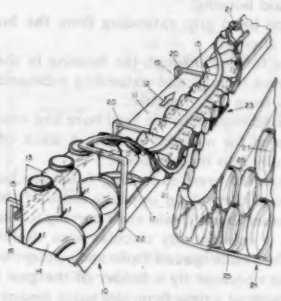


10. The method of applying filter material to drainage tubing concurrently with the installation thereof in the ground, comprising the steps of passing the pipe tubing through a tubular mandrel having a long sleeve of filter material gathered thereon as said tubing is installed in the ground, and securing to the tubing the end of said sleeve adjacent the mandrel end at which the tubing exits to cause the tubing to pull the said sleeve off the mandrel and about itself.

4,003,123
METHOD OF APPLYING TWO-PIECE JAR LIDS TO CONTAINERS

Charles W. Duke, Huntington, W. Va., assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Jan. 21, 1976, Ser. No. 650,824
Int. Cl.² B23P *19/00*
U.S. Cl. 29—429 **4 Claims**



1. A method of continuously assembling threaded, two-piece closures having open and closed ends connected by a threaded skirt to containers having a threaded finish portion, said method comprising the steps of:

conveying a plurality of said containers in series in an upright position;

pivoting said plurality of containers in series to a position with their axes substantially horizontal;

moving said plurality of containers in series to an assembly area with the threaded finish on each of the containers extending in the same direction;

moving a plurality of assembled two-piece closures in series to the assembly area, the closures having their open ends facing in the direction of the threaded finishes of the containers; and

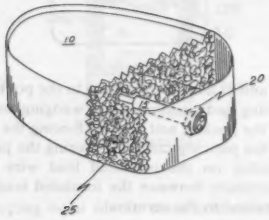
simultaneously therewith engaging the skirt of the closure with a stationary friction member which imparts rotation to said closure while maintaining the container in a relative non-rotative state, whereby the closure is rotated relative to the container finish and threaded thereon.

4,003,124

METHOD OF MAKING CANNED FOOD RECYCLABLE THERMAL SIMULATOR

Francis G. Connick, Downers Grove, Ill., assignor to Swift and Company Limited, Chicago, Ill.

Division of Ser. No. 499,296, Aug. 21, 1974, Pat. No. 3,964,313. This application Nov. 26, 1975, Ser. No. 635,658
Int. Cl.² B23P *3/00, 19/04*
U.S. Cl. 29—460 **13 Claims**



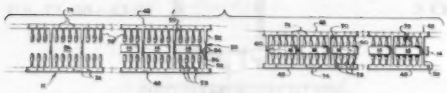
1. A method for producing recyclable canned food thermal simulators, comprising: filling a conventional food container with a suitable open cell porous matrix material, permanently securing any suitable thermometer to a panel of the container and positioning the thermometer to measure the internal temperature within about 1/16th inch of the centermost portion of the container, adding a suitable liquid for distribution throughout the porous matrix material when sealed under partial vacuum, said liquid having a specific gravity designed to produce the thermal conductivity constant of the canned food being simulated when subjected to the same external temperatures, drawing a partial vacuum on the filled container to distribute the liquid throughout the porous matrix material and thereafter sealing the container.

4,003,125

APPARATUS FOR MANUFACTURING DUAL IN-LINE PACKAGES

Charles W. Wallick, York, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 3, 1975, Ser. No. 628,367
Int. Cl.² H01L *21/28*
U.S. Cl. 29—569 R **13 Claims**



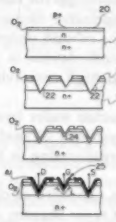
1. Apparatus for manufacturing dual in-line packages from leadless circuit modules and a lead frame assembly having a pair of spaced carrier strips with inwardly facing leads; the apparatus comprising a support; loading, closing, bonding, and bending stations on the support arranged along a lead frame assembly feed path, and feed means for moving the lead frame assembly along the feed path; the loading station including a leadless circuit module feed mechanism for positioning leadless circuit modules between the ends of the leads in the assembly as the assembly is moved past the loading station; the closing station including a number of closing units spaced along the feed path, each unit having a pair of collapse surfaces on opposite sides of the feed path and engagable with the outer edges of the carrier strips in the lead frame assembly, the surfaces of the units being spaced progressively closer together downstream along the feed path so that as the lead frame assembly is moved downstream past the closing station the carrier strips are forced together to move the ends of the leads against the leadless circuit modules; the bonding station including a lead bonder operable to bond the ends of the leads to the circuit pads on the leadless circuit modules; and the bending station including a lead bender for bending the ends of leads to a dual in-line configuration.

4,003,126

METHOD OF MAKING METAL OXIDE SEMICONDUCTOR DEVICES

Frank E. Holmes, Willowdale, and Clement A. T. Salama, Toronto, both of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Sept. 12, 1974, Ser. No. 505,369
Int. Cl.² B01J *17/00*
U.S. Cl. 29—571 **2 Claims**



1. A method of making metal oxide semiconductor field effect transistor devices comprising:

a. forming epitaxially a slice or slab of semiconducting material composed of an n^+ substrate layer and an n layer, said material having a (100) crystal orientation normal to the surface of the n layer,

b. forming by diffusion, a p^+ layer in said surface of the n layer,

c. forming an oxide layer on said p^+ layer,

d. opening a central and two outer windows in the oxide layer,

e. forming through the central window a central V-groove by anisotrophically etching the semiconducting material along a (100) plane, said groove extending through the p^+ layer, separating it into separate regions, and into the n layer and defining a conduction channel between said separated regions around the groove through the n-type material,

f. forming through the outer windows, outer V-grooves extending through the p^+ layer and the n layer into the n^+ substrate layer to effectively define the outer edges of the separated regions,

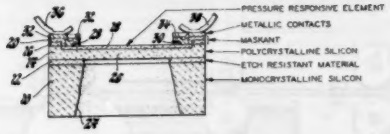
g. growing a gate oxide layer on the surface of the semiconductor, said layer extending over the surface of the said central V-groove, and

h. forming metal contacts to the two separate regions defining source and drain electrodes and to the gate oxide layer defining the gate electrode.

4,003,127
POLYCRYSTALLINE SILICON PRESSURE TRANSDUCER

James M. Jaffe, Southfield, and John Y. W. Seto, Warren, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 526,580, Nov. 25, 1974, Pat. No. 3,938,775, which is a continuation-in-part of Ser. No. 463,515, April 24, 1974, abandoned. This application Sept. 26, 1975, Ser. No. 616,959
Int. Cl.² B01J 17/00
U.S. Cl. 29—580 2 Claims



1. A method of accurately and consistently making an extremely sensitive and temperature stable semiconductor pressure transducer having a thin vapor deposited polycrystalline silicon diaphragm, said method comprising:

forming on one surface of a supporting semiconductor wafer a layer of etch-resistant material having a crystallographic structure which promotes vapor deposition of polycrystalline silicon;

vapor depositing an extremely thin, high resistivity polycrystalline silicon film of a predetermined thickness on said etch-resistant layer wherein said vapor deposition of polycrystalline silicon consistently and accurately defines the thickness of a diaphragm for said pressure transducer;

forming a pressure responsive electronic device into centrally located portions of said polycrystalline silicon film wherein said electronic device is automatically electrically isolated by said high resistivity polycrystalline silicon;

etching said semiconductor wafer from its opposite surface to remove central portions of said wafer in a predetermined geometry corresponding to a desired geometry for said diaphragm;

stopping the etch upon exposure of corresponding portions of said etch-resistant layer thereby defining a polycrystalline silicon diaphragm being peripherally supported by the remaining portions of said wafer;

removing said exposed portions of said etch-resistant layer from one surface of said polycrystalline silicon diaphragm and any oxide-based coating on its opposite surface, thereby providing a temperature stable diaphragm which is noncontiguous with any material having a dissimilar coefficient of thermal expansion; and

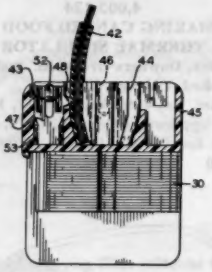
applying electrical contacts to said pressure responsive electronic device thereby providing electrical access to said pressure transducer.

4,003,128
METHODS OF MAKING INDUCTIVE DEVICES AND TERMINATION ARRANGEMENTS FOR SAME

Richard W. Dochterman, Fort Wayne, Ind., assignor to General Electric Company, Fort Wayne, Ind.

Division of Ser. No. 437,336, Jan. 28, 1974, Pat. No. 3,974,407. This application July 10, 1975, Ser. No. 594,582
Int. Cl.² H02K 15/00; H01F 41/10
U.S. Cl. 29—596 1 Claim

1. A method of making an assembled device including a magnetic core and coil assembly having at least one insulating body associated therewith, and at least one insulated lead wire, the device further including at least one terminal having at least one insulation piercing tang, the method comprising the steps of: assembling together the magnetic core, the insulating body, and a coil having at least one coil lead extending therefrom; attaching the at least one coil lead to the terminal so as to establish electrical continuity therebetween and inserting the terminal into a connection receiving and retaining portion of the insulating body with the piercing tang pointed toward a pocket established by the insulating body; placing the insulated lead wire adjacent the insulation piercing tang of

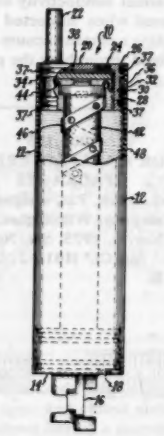


the terminal and at least in proximity to the pocket established by the insulating body; and moving a wedging member relative to and along the pocket, and thereby forcing the insulated lead wire against the piercing tang and causing the piercing tang to pierce insulation on the insulated lead wire and establish electrical continuity between the insulated lead wire and the coil lead attached to the terminal.

4,003,129
METHOD OF MAKING CURRENT LIMITING FUSE HAVING A FILTER DISPOSED IN ONE END CAP

Robert E. Koch, Pittsfield, and James H. Ceder, Lenox, both of Mass., assignors to General Electric Company

Division of Ser. No. 621,053, Oct. 9, 1975, Pat. No. 3,967,228. This application Jan. 23, 1976, Ser. No. 651,707
Int. Cl.² H01H 69/02
U.S. Cl. 29—623 3 Claims



1. The method of manufacturing a current limiting fuse, comprising the steps, of:

a. assembling internal components of the fuse in a housing which includes end caps provided, respectively, with fill port and drain port;

b. packing the fuse with a particulate filler;

c. filling the fuse with colloidal silica suspension by forcing said suspension into said fill port and passing it at the other end of said fuse through a filter just before it drains out through said drain port;

d. removing excess solution from said fuse, and

e. drying said fuse by passing a drying gas through said fuse to remove the fluid from the residual suspension and to thereby result in a bonding together of said particulate filler inside said fuse.

4,003,130

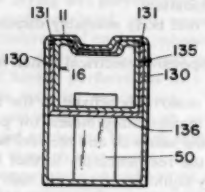
HAIR RAISING PANEL FOR ELECTRIC SHAVERS

James E. Rookus, 2902 Marshall SE., Apt. E-11, Grand Rapids, Mich. 49508

Continuation-in-part of Ser. No. 478,620, June 12, 1974, Pat. No. 3,940,851. This application Dec. 24, 1975, Ser. No. 644,142

Int. Cl.² B26B *19/10*

U.S. Cl. 30—34.2 16 Claims



12. In a cutting head for an electric shaver having a thin screen and a driven cutting blade movably mounted within and engaging the inside surface of said screen, said screen and said blade each having a top surface and a pair of sides, a plurality of openings through said top surfaces of said screen and said blade, portions of said openings extending down said sides through which individual hairs may pass to be sheared by said blade, the improvement in said cutting head comprising: a thin, rigid element fixed within said blade for movement therewith and seated against an inner side face of said blade, the top edge of said element being parallel with the top surface of said blade and in the same general horizontal plane as the inside surface of said top surface of said blade and overlaying the lower part of those portions of said openings extending down said sides of said blade for erecting individual hairs into a posture generally normal to the skin as the hairs pass through said openings.

4,003,131

DRY-SHAVING APPARATUS WITH RECIPROCATABLE CUTTING BLOCK

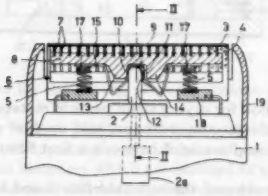
Gerrit Jan Groothuis, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 2, 1975, Ser. No. 564,226

Claims priority, application Netherlands, Apr. 5, 1974, 7404655

Int. Cl.² B26B *19/02*

U.S. Cl. 30—43.92 3 Claims



1. An electric shaver comprising a housing, a shaving head at the top of said housing, an electric motor mounted in said housing, a drive pin reciprocally driven by said motor, the pin having an end part extending into said shaving head, a thin shear plate having a plurality of hair-entrance apertures mounted in said shaving head, a cutter assembly comprising a frame, a plurality of cutters carried by the frame, the cutters having cutting edges having shape conforming to and engaging said shear plate, said frame further including a coupling slot defining spaced first and second walls for receiving therein said drive end of the drive pin in drive engagement, and connection means in said slot adjacent said first wall of said slot contacting and resiliently urging said drive pin end firmly against said second wall of the slot, said connection means comprising a strip of material conforming generally in shape to and situated in said coupling slot, said strip comprising a spring section adjacent said first wall of the coupling slot, this section including a slot defining a tab bent out of the plane of said section for resiliently engaging said drive end of the drive pin.

4,003,132

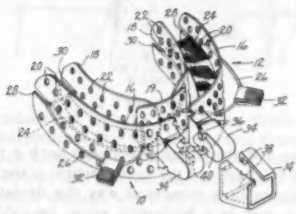
DEVICES AND METHODS FOR TAKING DENTAL IMPRESSIONS

Joseph F. Beck, 33 Huntington Road, Newton, Mass. 02158

Filed May 19, 1975, Ser. No. 578,718

Int. Cl.² A61C *9/00*

U.S. Cl. 32—17 9 Claims



1. A tray assembly for taking a dental impression in a patient's mouth in an impression medium contained in the tray assembly comprising buccal and lingual plates each relatively rigid to resist deformation in a vertical plane by the hydraulic pressure of the medium while in the patient's mouth when the patient bites down upon the medium but sufficiently bendable to adapt to the contour of the patient's arch, flexible strand means interconnecting the two plates for forcing the plates closer together to apply lateral pressure to the medium and a medium supporting means including a web interposed between the lingual and buccal plates and positioned to coincide with the patient's occlusal plane.

4,003,133

METHOD FOR THE ALIGNMENT OF MACHINE PARTS

Johannes A. F. Pierik, Santpoort, Netherlands, assignor to Papierfabrieken Van Gelder Zonen N.V., Amsterdam, Netherlands

Filed May 21, 1974, Ser. No. 471,971

Claims priority, application Netherlands, May 21, 1973, 7307071

Int. Cl.² G01B *11/27*

U.S. Cl. 33—228 9 Claims

1. A method of optically aligning parts of a machine comprising the following steps:

a. providing two reference marks entirely outside the machine and at a distance from each other as long as possible, determining a base line usually running parallel to the longitudinal center line of the machine;

b. mounting, beyond the machine as seen in the longitudinal direction of the machine and to the side of the machine as seen perpendicularly to the longitudinal direction of the machine, a reflecting device with the aid of optical means, the effects of the reflecting device corresponding

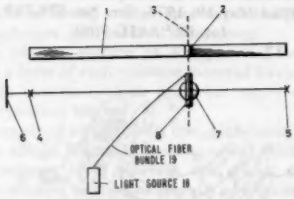
to that of one single reflecting surface and the mounting carried out in such a way that each intersection of this reflecting surface with a horizontal plane is a straight line intersecting or crossing the base line perpendicularly;

c. placing the viewer of a theodolite approximately in line with the center line of a machine part to be aligned, or in line with a generating line on the surface of said part and extending parallel to said machine part center line;

d. turning the view direction of the viewer over about 90° around a vertical axis and pointing the viewer towards the reflecting device in such a way that the point of intersection of the reticle of the viewer coincides with a point of the reflection image of the vertical line of said reticle;

e. turning the view direction of said viewer over exactly 90° about a vertical axis;

f. determining with the aid of the viewer adjusted in step (e) and rotatable in a vertical plane perpendicular to the base line, the distance between a point of the machine part center line or a generating line of said machine part at the front of this part and a vertical plane perpendicular to the



base line and the distance between such a point at the back of this part and the same vertical plane;

g. determining in a numerical way the deviation of said machine part in a horizontal plane by calculating the differences between the two distances determimed in step (f);

h. determining with the aid of a water level and a theodolite the distance between a point of the center line or the generating line at the front of said machine part and a horizontal plane and the distance between such a point at the back of said machine part and the same horizontal plane;

i. determining in a numerical way the deviation of said machine part in a vertical plane by calculating the difference between the two distances determined in step (h);

j. correcting the position of said machine part in accordance with the numerical values of the deviations obtained in steps (g) and (i) respectively; and

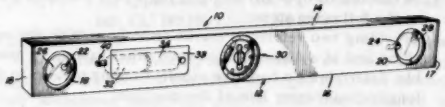
k. repeating steps (c–j) for the other machine parts to be aligned.

4,003,134

AUTOMATIC LIGHTED LEVEL AND ANGLE FINDER

David Adams, Box 161, Spring Branch Road, Jeremiah, Ky. 41826

Filed Aug. 6, 1975, Ser. No. 602,307
Int. Cl.² G01C 9/06
U.S. Cl. 33—348 **12 Claims**



1. An automatic lighted level and angle finder, comprising, in combination:

a. a frame having a planar surface arranged for abutting against an object the orientation of which is to be determined and adjusted;

b. electrical energized visual indicator means mounted in the frame for indicating when the planar surface is oriented at an angle corresponding to the angular orientation being determined; and

c. angle-sensing switch means adjustably mounted on the frame and connected to the indicator means and a source of electrical power for being set at an angle relative to the planar surface and energizing the indicator means by closing an electrical circuit connecting the indicator means to the source of electrical power when the orientation of the planar surface corresponds to the angle set on the switch means, the frame being provided with an opening receiving the level sensing switch means, and the level sensing switch means including a reel assembly, comprising, in combination:

1. an annular reel body rotatably disposed in the opening provided in the frame;

2. a gravity-responsive electrical switch mounted in the reel body; and

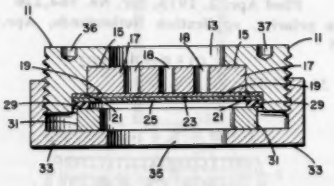
3. a side wall removably affixed to the reel body and provided with manipulating means for permitting selective rotation of the side wall and the reel body with respect to the frame, the reel assembly further including a pair of substantially liquid-filled arcuate vials curved to conform to the circumference of and mounted in opposed relation within the side wall, the uppermost vial in any orientation of the planar surface forming a reading bubble.

4,003,135

SPECIMEN HOLDER AND TECHNIQUE EMPLOYED TO EFFECT A CONTINUOUS MAXIMUM CONCENTRATION GRADIENT IN CRITICAL POINT DRYING

Frederick L. Baker, Lacon, and Lambertus H. Princen, Peoria, both of Ill., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed June 13, 1975, Ser. No. 586,783
Int. Cl.² F26B 5/00, 25/18
U.S. Cl. 34—9 **10 Claims**



10. A method for drying small particle materials for viewing through an electron microscope, said method comprising:

a. placing said material between a first filter and a second filter;

b. passing ethanol through said filters and in contact with said material;

c. subsequently passing amyl acetate through said filters and in contact with said material;

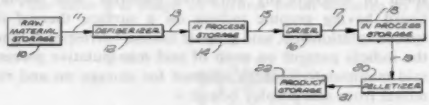
d. subsequently passing liquid CO_2 through said filters and in contact with said material; and

e. removing said liquid CO_2 from said material.

4,003,136
METHOD FOR THE DRYING AND RECOVERY OF POLYETHYLENE WASTE MATERIAL

David N. Vincent, and Charles L. Segal, both of 6458 Bluefield Place, San Diego, Calif. 92120

Filed Feb. 3, 1975, Ser. No. 546,441
Int. Cl.² F26B 7/00
U.S. Cl. 34—12 14 Claims



1. A method for drying wet polyethylene waste material to a predetermined moisture level, said waste material being confined in an enclosure, said enclosure having a hollow drum and an air inlet and outlet therein, said drum defining an enclosed area and having perforations of a size suitable for retaining said waste material, comprising:

exposing said waste material to a high velocity heated air flowing into said enclosure through said inlet and out of said enclosure through said outlet,

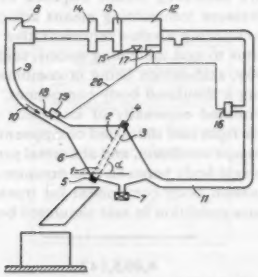
controlling the temperature of said heated air at said inlet to be at a specified value within a predetermined temperature range, whereby said waste material is dried by said heated air with minimal fusing of said waste material to said drum, and

controlling the time duration that said waste material is exposed to high velocity heated air by terminating said heated air flow when the temperature of said heated air at said outlet reaches a specified temperature between about 3° F and about 15° F lower than said specified value at said inlet.

4,003,137
METHOD OF DRYING WET POWDER

Lars-Erik Björn, and Mats Jurgen Martin Olsson, both of Karlskoga, Sweden, assignors to AB Bofors, Bofors, Sweden

Filed Oct. 1, 1974, Ser. No. 510,876
Claims priority, application Sweden, Oct. 1, 1973, 7313296
Int. Cl.² F26B 3/14
U.S. Cl. 34—25 4 Claims



1. A method for the drying of nitrocellulose powder comprising the steps of:

a. admitting the wet powder with liquid into the upper part of a frame comprising a pair of generally parallel spaced foraminous members which are inclined at an acute angle to the horizontal, the wet powder being admitted in sufficient quantity to substantially fill the spaces between the members;

b. directing a stream of a drying gas against the upper one of said members;

c. receiving the dried powder from between the spaced members at the bottom of the frame;

d. removing the liquid through the apertures in the lower one of said members;

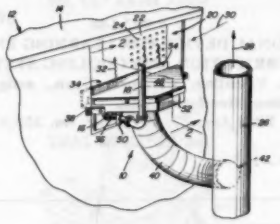
e. selecting the angle of inclination of the frame to be between 5° and 45° to the horizontal;

f. selecting the velocity of the drying gas such that in conjunction with the selected said angle of inclination the powder is spread on a substantially even layer over the lower one of said frame members throughout the drying of the powder.

4,003,138
AIR CURTAIN FOR CLOTHES DRYER

Wayne M. Wicks, 13th and Johnson Sts., Sturgis, Ky. 42459

Filed Sept. 23, 1975, Ser. No. 615,974
Int. Cl.² F26B 19/00
U.S. Cl. 34—86 9 Claims

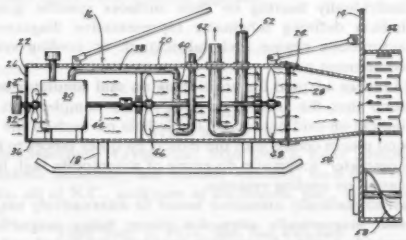


1. In combination with an air heating dryer or the like having an enclosure within which a heating device is located for heating air entering the enclosure through an intake opening to atmosphere and wherein the enclosure is vented by an exhaust conduit through which an outflow stream of heated air is conducted, means for preheating air entering the enclosure, comprising flow diverting means connected to the exhaust conduit for receiving said heated air under a relatively high outflow velocity, and flow directing means connected to said flow diverting means for atmospherically discharging said heated air adjacent to said intake in a direction transversely of the inflow through the intake to establish an unconfined curtain of heated air externally of the enclosure through which the air entering the intake must pass.

4,003,139
GRAIN DRYER

Clinton T. Van Winkle, Cairo, Nebr. 68824

Filed May 6, 1975, Ser. No. 567,726
Int. Cl.² F26B 19/00
U.S. Cl. 34—86 1 Claim



1. In combination with a combine having a first engine and a grain tank, comprising,

a portable grain dryer mounted on said combine,

said grain dryer comprising a housing having first and second ends, an air cooled engine mounted in said housing

inwardly of said first end, said air cooled engine having an exhaust pipe extending therefrom through said housing and thence outwardly to the atmosphere, a fan means rotatably mounted in said housing and being driven by said air cooled engine whereby said fan means will draw air inwardly into said housing first end and force air outwardly from said housing second end,

said second end of said housing being in operative communication with the lower interior of the grain tank whereby the air passing through said housing will be heated by the heat from said air cooled engine and said exhaust pipe and will be forced into the lower interior of the grain tank by said fan means,

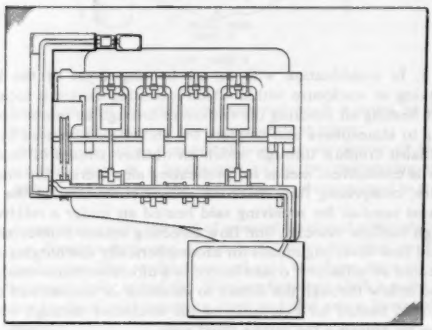
and an exhaust pipe portion extending from said first engine through said housing so that the heat from said exhaust pipe portion will further heat the air passing through said housing.

4,003,140

EDUCATIONAL DEVICE FOR LEARNING ENGINE FUEL, LUBRICATION AND COOLING SYSTEMS

Charles G. Valentine, Stamford, Conn., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 27, 1973, Ser. No. 355,135
Int. Cl.² G09B 25/02
U.S. Cl. 35—13 **5 Claims**



1. An educational kit programmed for teaching automobile fuel, engine lubrication, and engine cooling systems comprising as integrated component parts thereof:

a. a simulator board having a surface of magnetically attractive material and including graphic indicia on the surface thereof defining a schematic sectional diagram of an automobile engine block, the indicia on said simulator board being as shown by the non-numerical indicia of FIG. 1;

b. a plurality of magnetically attractive manipulative pieces individually bearing on their surfaces specific graphic indicia defining schematic representative diagrams of automobile engine fuel, lubrication, or cooling system component parts,

said pieces adapted for positioning on said simulator board such that the indicia on said pieces complements the indicia on said board and the indicia on each of the several pieces coacts with the indicia on other pieces to form completed schematic diagrams of automobile fuel, lubrication or cooling systems;

said magnetically attractive board or alternatively each of said magnetically attractive pieces being magnetic to provide a mutual attraction between said board and said pieces, the indicia on said manipulative pieces being as shown by the non-numerical indicia of FIG. 3; and

c. audio-visual instructional means including synchronized recordings and visual slides or filmstrips presenting information relevant to the automotive systems including information defining the relationship between the indicia on said pieces and the indicia on said simulator board;

said audio-visual instructional means further characterized in that it is periodically stopable to permit the user to perform a manipulative activity requested by the instructional means using said simulator board and said manipulative pieces, and being restartable again by the user upon completion of the activity;

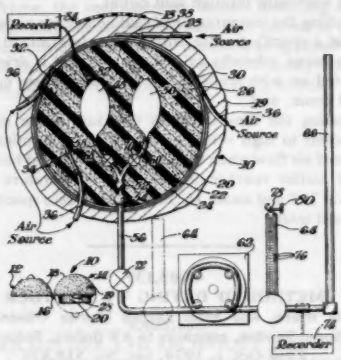
d. a display board for said manipulative pieces including a sheet of magnetically attractive material, said display board having graphic indicia on a surface thereof in spaced relationship, said graphic indicia corresponding to the indicia present on each of said manipulative pieces, said manipulative pieces adapted for storage on and removal from said display board.

4,003,141

INTRACRANIAL PRESSURE MONITORING DEVICE

Pierre L. Le Roy, Wilmington, Del., assignor to New Research and Development Lab., Inc., Wilmington, Del.

Filed Apr. 1, 1975, Ser. No. 564,039
Int. Cl.² G09B 23/32
U.S. Cl. 35—17 **16 Claims**



1. An intracranial pressure monitoring device comprising a pressure sensor, means for mounting said sensor within the skull of a body at the situs where the pressure is to be monitored, pressure indicating means disposed externally of the body, situs pressure transmitting means associated with said sensor for transmitting a value representative of the pressure at the body situs to said indicating means, said body being an inanimate body, said device being in combination therewith, said situs being a simulated body component, pressure creating means mounted externally of said body and connected thereto remote from said simulated component for creating an abnormal pressure condition, and abnormal pressure transmitting means in said body between said pressure creating means and said simulated body component for transmitting the abnormal pressure condition to said simulated body component.

4,003,142

SCULPTURING KIT AND METHOD FOR PRODUCING DEHYDRATED FORMS FROM HYDRATED ARTICLES

Howard J. Morrison, Deerfield, and Robert K. Allen, Frankfort, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Feb. 10, 1975, Ser. No. 548,251
Int. Cl.³ A63H 9/00; A21B 1/22
U.S. Cl. 35—26 **11 Claims**

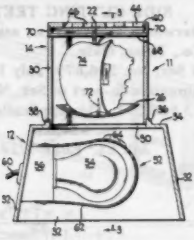
1. A sculpturing kit for use with a hydrated article, such as a fruit or vegetable, for forming dehydrated sculptures from said articles, comprising, in combination:

a base structure including a heat source mounted within the base;

at least one heating chamber removably mounted on the base in a heat transfer relationship with the heat source therein;

at least one implement for sculpturing the article;

template means to assist the user in sculpturing the desired shape of the article prior to dehydration, said template means including a plurality of individual templates, each template having at least one pin for puncturing the article to mount the template thereon, said templates being in the form and shape of various facial features to permit



sculpturing of the article therearound to provide more distinguishable facial characteristics on the article; and

means for mounting the article in the heating chamber, said mounting means including a generally horizontal rod mounted generally at the top of the heating chamber and means for embedding within the article including an extended member for supporting the article in a hanging position from the horizontal rod out of contact with any portion of the heating chamber whereby heat derived from the heat source partially dehydrates the article to form a sculpture.

4,003,143

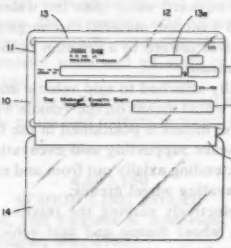
CHECK WRITING GUIDE

John E. Keltzer, and Betty Jo Keltzer, both of Lake Wales, Fla., assignors to Betty J. Keltzer, Lake Wales, Fla.

Filed Dec. 15, 1975, Ser. No. 640,462

Int. Cl.² G09B *21/00*

U.S. Cl. 35—38 **2 Claims**



1. A check writing guide for use by the blind comprising a rigid generally rectangular backing plate, a rectangular cavity formed in one face of said backing plate sized to freely accommodate a conventional blank bank check and extending to one end margin of said backing plate, a template insertable in said cavity from said one end margin of the backing plate for closing the cavity and overlying a check received therein, said template being apertured to guide the hand-written information conventionally applied to a check, and a base plate having substantially the same size as said backing plate and hinged thereto along adjacent long margins of the plates, whereby a check may be inserted at said one margin of said backing plate into said cavity and under said template, the base plate serving as a stabilizing rest for the wrist of the check writer and the orientation of said base plate with respect to said backing plate and template being reversible by removing said template, rotating said backing plate through 180°, and then reinserting the template into said cavity thereby accommodating the stabilizing rest function of the base plate to either right or left handed users.

4,003,144

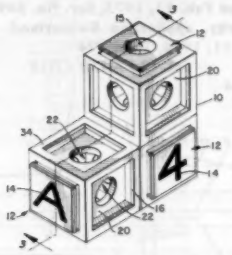
EDUCATIONAL BLOCK WITH REPLACEABLE CHIP

Robert Maddestra, Canton, and David E. Munn, Framingham, both of Mass., assignors to Damon Corporation, Needham Heights, Mass.

Filed July 11, 1975, Ser. No. 595,301

Int. Cl.² A63H *33/08*

U.S. Cl. 35—70 **4 Claims**



1. An educational block comprising a block and a removable chip in combination, said block being formed of a polymeric material and having the general configuration of a cube with a square recess of predetermined depth on each face for receiving the removable chip, each face of the block also defining an aperture for reducing the weight of the block without reducing its strength, said chip being fabricated of a polymeric material and including opposed flexible lips about a groove around the perimeter of the chip, each of said lips having a first predetermined thickness and said groove having a second predetermined thickness, the combined thickness of a lip and said groove being more than said recess depth, whereby an exposed portion of the groove of a first chip received in a block recess enables a second chip's lip to be received therein, whereby one chip can be used to remove another chip secured in a recess in the block, said chip also having a thickness substantially twice the depth of the recess on the face of the block in order that a single chip may be used to fasten opposed faces of two blocks together and wherein the chip has a square configuration to prevent the movement of mated faces when secured together.

4,003,145

FOOTWEAR

Anton Liebscher, Waynesville; Sven Oberg, Lake Junaluska; Kenneth Smathers, and Horace Auberry, both of Waynesville, all of N.C., assignors to Ro-Search, Inc., Waynesville, N.C.

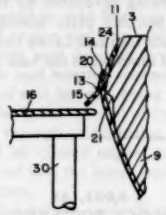
Filed Aug. 1, 1974, Ser. No. 493,965

Int. Cl.² A43B *13/18*; A43D *21/00*

U.S. Cl. 36—17 PW **7 Claims**

1. Footwear comprising an upper, a welt secured to said upper substantially above the insole level, a tread sole, said tread sole having a portion thereof extending upwardly substantially above the insole level to form a peripheral side

extension molded to said welt, said sole and side extension being formed of elastomeric material, said welt having a portion thereof extending over and covering and sealing the entire upper peripheral edge of the extension of the tread sole.



4,003,146

METHOD OF MANUFACTURE OF A SHOE

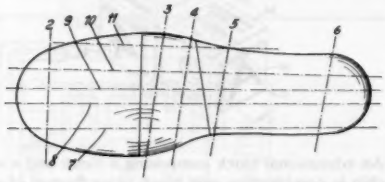
Ernst Meier, Schutzengasse 22, CH-8001 Zurich, and Alois Odermatt, Barzstrasse 2, CH-8437 Zurzach, both of Switzerland

Filed Feb. 13, 1975, Ser. No. 549,580

Claims priority, application Switzerland, May 31, 1974, 7487/74; Dec. 11, 1974, 16447/74

Int. Cl.² A43B *13/18*

U.S. Cl. 36—44 **9 Claims**



1. An inner bottom member for a shoe for fitting onto a last and connection with a shank and outer sole and comprising,

an under surface for said member which is substantially flat both between the location of the tips and balls of the toes toward the front of the foot and also in the heel region,

an upper surface for said member which defines depressions therein both for the ball of the big toe and the small toe while arching upwardly between said depressions in the lateral cross-section of said member, the depression for the small toe being shallower than that for the big toe,

said upper surface of said member being of concave curvature in lateral cross section in the region of the heel with a maximum radius of curvature which is 1.5 times the greatest width of said member,

said upper surface of said member having a longitudinal inclination of no more than 10° with the plane of the toe region.

4,003,147

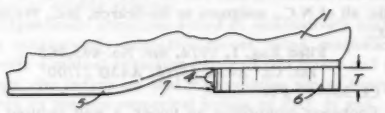
SHOE SHOELACE ACCESSORY

George J. Bayder, New York, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed May 27, 1975, Ser. No. 581,360

Int. Cl.² A43B *23/00*

U.S. Cl. 36—136 **2 Claims**



1. A shoelace accessory in combination with a shoe, said shoe having a bottom, a heel having a thickness defined by a front surface substantially perpendicular to the bottom and extending a predetermined distance beneath the bottom of the shoe, a back, a pair of sides and a shoelace, said shoelace accessory comprising

a sealed container permanently affixed to the front surface of the heel and having an openable cover; and

an extra shoelace housed in the container.

4,003,148

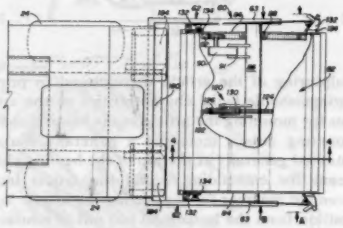
WHEEL EXCAVATOR WITH PIVOTALLY MOUNTED SIDE CUTTING TEETH

Charles R. Satterwhite, Dallas, Tex., assignor to Unit Rig & Equipment Co., Tulsa, Okla.

Continuation of Ser. No. 596,679, July 17, 1975, abandoned, which is a continuation-in-part of Ser. No. 435,296, Jan. 21, 1974, Pat. No. 3,896,571. This application Feb. 2, 1976, Ser. No. 654,654

Int. Cl.² E02F *3/24*

U.S. Cl. 37—190 **20 Claims**



1. An excavating and loading system comprising in combination:

a vehicle;

means supporting the vehicle for movement over a surface;

excavating wheel means for forming an excavation including a plurality of digging buckets each having a cutting edge which extends to the stationary rear wall and a movable front wall mounted for pivotal movement from a material receiving position to a material dumping position, movable side walls mounted for pivotal movement between a first material receiving position wherein the walls pivot outward wider than the widest portion of the vehicle and a second material discharge position wherein the walls pivot inward to a position flush with the side of the wheel means;

means pivotally attached to said vehicle and supporting the excavating wheel means on the vehicle whereby the excavating wheel means is positioned in the front of the vehicle, said means supporting said excavating wheel having portions extending axially out from and engaging the ends of the excavating wheel means;

means for selectively varying the relative position of said excavating wheel means and said vehicle whereby said excavating wheel means can be selectively raised or lowered to excavate at various depths;

drive means for rotating the excavating wheel means so that the digging buckets follow a circular path;

means located within the margins of the excavating wheel means and responsive to rotation thereof for positively positioning the movable front wall of each digging bucket in the material dumping position when the bucket is in the upper and rearward portion of the path and for positively positioning the movable side walls in the material digging and dumping positions; and

conveyor means mounted on the vehicle entirely behind the excavating wheel assembly for movement around a course including a relatively low portion positioned to receive material from the digging buckets of the excavat-

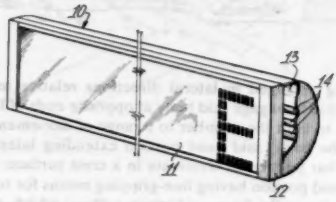
ing wheel means and a relatively high discharge position located rearwardly on the vehicle.

4,003,149

DISPLAY DEVICE AND DISPLAY UNIT FOR USE THEREIN

Peter de Vries, R.R. No. 1, Lachute, Quebec, Canada

Filed Nov. 26, 1974, Ser. No. 527,270
Int. Cl.² G09F 9/30, 13/34
U.S. Cl. 40—28 C **18 Claims**



1. A display device comprising:
a. an array of a plurality of display units arranged in rows and columns,
b. means defining a path for light through each unit,
c. each said unit having a movable control member having a light transmitting condition and a light occluding condition for displaying a selected pattern of light by actuation of selected ones of said units to their transmitting condition,
d. first energization means interconnecting all the units of alternate columns of units as a first group,
e. second energization means interconnecting as a second group all the units of the columns of units intermediate those of the first group,
f. means interconnecting each individual unit to the adjacent unit of the same row in a downstream direction for controlling said downstream unit and hence rendering said downstream unit a "slave" unit to the upstream unit which latter thus becomes a "master" unit for reproducing in the slave unit the condition of such upstream master unit,
g. first means for actuating said first energization means for simultaneously rendering all units of said first group master units and all units of the second group slave units,
h. second means for actuating said second energization means for simultaneously rendering all units of the second group master units and all units of the first group slave units, and
i. means for operating said first and second actuating means alternately to cause said pattern to travel along the array.

4,003,150

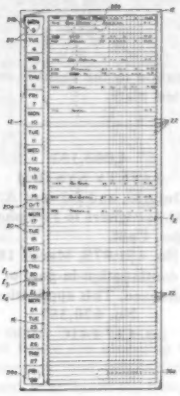
SCHEDULING BOARD

John S. Anderson, and Virginia B. Anderson, both of Manor Hill Farm, Glenarm, Md. 21057

Filed Mar. 19, 1976, Ser. No. 668,576
Int. Cl.² G09F 3/20
U.S. Cl. 40—64 R **8 Claims**

1. A job or operation scheduling board providing a visual listing of a plurality of jobs, operations, etc. scheduled or contracted to be undertaken and the progress thereof in relationship to the time allotted to each for their completion, comprising:

an elongate rectangular planar board of rigid material, means providing with the planar outer face of the board a relatively narrow-width vertical slideway extending along one side edge thereof and for substantially the full length of said side edge, a plurality of discrete planar tabs of equal vertical height and having horizontal top and bottom edges arranged in column formation in said slideway and with said edges disposed in abutting relationship, said tabs being inscribed on their outer planar faces with markings indicative of the days of a normal work week and the consecutive dates of a plurality of such working days within a specified time such as a month, means providing with the planar outer face of said board a channel of substantially greater lateral dimension than that of said slideway and extending from said slideway to the opposite side edge of the board and a multiplicity of transversely elongate semi-rigid strips normally disposed in top-to-bottom edge engagement in said channel and being inscribed on their outer faces with job or operation



data, the vertical height of said strips being a known fraction of the vertical height of any one of said tabs whereby the total vertical height of a plurality of said strips equals the vertical height of one or more tabs of the vertical column thereof, means normally retaining both the tabs and elongate strips in slidable engagement on the outer planar face of the board, the tabs being slidable upwardly in the slideway as a column upon removal of the topmost tab and said topmost strips being each manually liftable from the channel in response to bowing force applied to their middle length portions from beneath same whereupon all lower strips may be slid upwardly in their channel to positions filling the space or spaces previously occupied by said topmost strips.

4,003,151

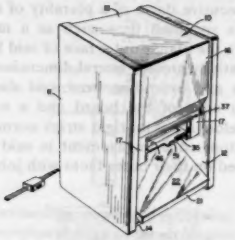
TEST PLATE READER

Felix P. Tolosa, and Miles G. Hossom, both of Alexandria, Va., assignors to Dynatech Laboratories, Incorporated, Alexandria, Va.

Filed Oct. 3, 1975, Ser. No. 619,183
Int. Cl.² G09F 13/10
U.S. Cl. 40—106.1 **9 Claims**

1. Apparatus for viewing the wells of a transparent test plate having a multiplicity of individual test material containing wells arranged in predetermined relative location, comprising means including a light source defining a light path, means for mounting said test plate in predetermined location in said path, and a target mounted across said light path between the

source and said test plate, said target having a multiplicity of individual substantially opaque areas corresponding in number and relative location to the number and relative location of the wells in the test plate.



4,003,152

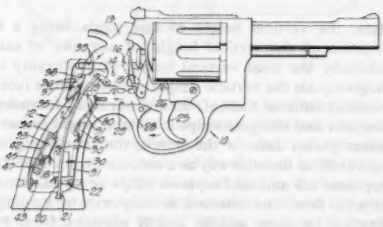
SAFETY SYSTEM

James N. Barker, Ontario, and Edward A. Cartwright, Montclair, both of Calif., assignors to Precision Thin Film Corporation, Los Angeles, Calif.

Division of Ser. No. 451,975, March 18, 1974, Pat. No. 3,939,679, and a continuation-in-part of Ser. No. 371,378, June 19, 1973, abandoned. This application Oct. 7, 1975, Ser. No. 620,357

Int. Cl.² F41C *17/00*

U.S. Cl. 42—70 R **23 Claims**



1. In a hand-held firearm for operation only by authorized personnel, the combination comprising:

a firing mechanism;

first means positioned on said firearm and normally locking said mechanism in an inoperative position; and

second means adapted to be carried by said authorized personnel and including means for transmitting a radiated energy control signal to which said first means is responsive only at the option of said authorized personnel to deactivate said first means and restore the operability of said firing mechanism.

4,003,153

FISHING ROD MOUNTED LINE-DETAINING DEVICE

James E. Khalil, 6511 Marsol Road, Apartment 204, Mayfield Heights, Ohio 44122

Filed Jan. 12, 1976, Ser. No. 647,881

Int. Cl.² A01K *87/00*

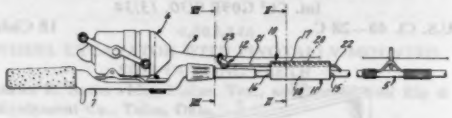
U.S. Cl. 43—25 **8 Claims**

1. A line-detaining device for attachment to a fishing rod comprising:

a support body having an upper surface and an undersurface at opposite sides thereof, said undersurface being adapted in the lengthwise sides thereof, said undersurface being adapted in the lengthwise direction of the body to engage a longitudinal surface of a fishing rod with the rear end of the body nearer the handle and reel of the fishing rod, said body having an elongate guideway extending in said lengthwise direction through said body;

a slide member having a substantially straight elongate bar portion of a length substantially exceeding that of the passageway, a head portion connected with the rear end of the bar portion, and a detent portion connected with the front end of the bar portion, said head detent portions being arranged in lateral directions relative to the bar portion to engage said body at opposite ends of the guideway to limit the member to a range of movement relative to the body, said head portion extending laterally from the bar portion to terminate in a crest surface;

said head portion having line-gripping means for receiving a line inwardly from said crest surface which enables a fishing line to be pinched and frictionally gripped by said head portion.



4,003,154

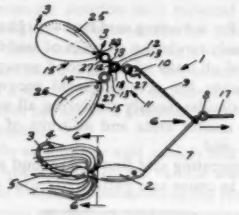
FISHING LURE

Robert G. Carver, P.O. Box 44, Athens, La. 71003

Filed Aug. 25, 1975, Ser. No. 607,106

Int. Cl.² A01K *85/00*

U.S. Cl. 43—42.13 **16 Claims**



1. A fishing lure comprising:

a. a body;

b. at least one hook carried by said body;

c. at least one wire harness, one end of which is carried by said body and the opposite end of which is disposed at a distance from said body;

d. triangle swivel means having a first, second and third seivel leg, each disposed in spaced, rotatable relationship with respect to the other, said first swivel leg carried by said opposite end of said wire harness;

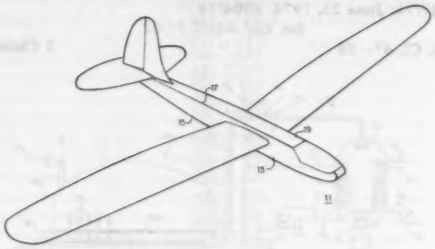
e. eye means in said wire harness for attaching a fishing line; and

f. a first spinner carried by said second swivel leg of said triangle swivel means and a second spinner carried by said third swivel leg of said triangle swivel means, said first spinner and said second spinner disposed to move when said lure is pulled through the water.

4,003,155
MODEL AIRCRAFT AND PACKAGE

Jef Raskin, Brisbane, Calif., assignor to Jef's Friends, Brisbane, Calif.

Filed Apr. 7, 1975, Ser. No. 565,766
Int. Cl.² A63H *27/00*
U.S. Cl. 46—79 12 Claims

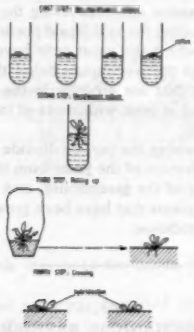


8. In a model aircraft, an airfoil comprising:
a plurality of rib elements for defining an airfoil shape;
a forming element of a material having on one side a plurality of parallel channels, said forming element being stretched around said plurality of rib elements with said channels facing away from said rib elements; and
a covering sheet stretched around said forming element.

4,003,156
PROCESS FOR OBTAINING VARIANTS OF PLANTS WITH IMPROVED CHARACTERISTICS

Monique Sibi, Orsay, and Yves Demarly, Versailles, both of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

Filed June 17, 1975, Ser. No. 587,611
Claims priority, application France, June 20, 1974, 74.21535
Int. Cl.² A01G *1/00*; A01H *1/00*
U.S. Cl. 47—58 27 Claims

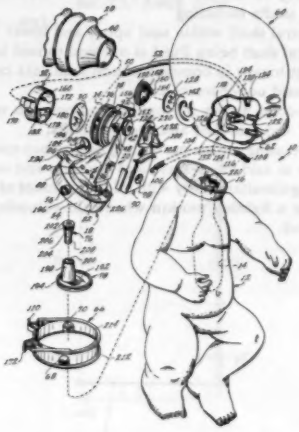


1. A process for obtaining variants of plants having improved characteristics which comprises the following steps of
1. placing and culturing, on a non-morphogenic synthetic nutrient medium, tissues obtained from the germination of seed from a single homozygous seed-plant, the said culture medium essentially consisting, firstly, of a basic medium formed of mineral salts, vitamins, iron and saccharose, and secondly, of growth substances in an amount sufficient to ensure callus formation,
2. sub-culturing the so formed calluses on a morphogenic medium consisting of the above basic medium having different levels of saccharose and growth substances until plants of varying characteristics are formed,
3. selecting each viable plant, and,
4. selfing it to obtain a strain thereof.

4,003,157
SNEEZING DOLL IMPROVEMENT

Benjamin Guzman Guerrero, Los Angeles, Calif., assignor to Mattel, Inc., Hawthorne, Calif.

Filed Dec. 3, 1975, Ser. No. 637,357
Int. Cl.² A63H *5/00*
U.S. Cl. 46—118 2 Claims

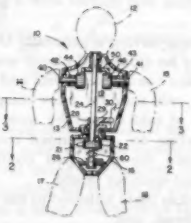


2. In an animated figure toy including a head in which a liquid-containing reservoir and means for pressurizing said reservoir are mounted, said figure toy being adapted to simulate a sneezing seizure, said simulation including the expulsion from said head of liquid supplied from said reservoir, wherein the improvement comprises that said reservoir includes:
a first housing member including a front wall having a rear surface, an encompassing side wall and an open rear portion;
a water inlet, a water outlet and an air inlet mounted on said front wall in fluid communication with its rear surface;
a second housing member sealed to the open rear portion of said first housing member; and
a check valve mounted in said reservoir between said housing members.

4,003,158
FIGHTING DOLL

Tobin Wolf, Passaic, N.J., and Tit Shing Wong, Kowloon, Hong Kong, assignors to Mego Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 502,436, Sept. 3, 1974, abandoned. This application Aug. 1, 1975, Ser. No. 601,090
Int. Cl.² A63H *11/00*
U.S. Cl. 46—120 13 Claims



1. A fighting doll comprising:
a. a lower torso having legs depending therefrom;
b. an upper torso pivotably mounted to said lower torso;
c. a first arm rotatably mounted to said upper torso;

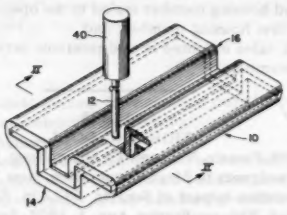
d. a second arm rotatably mounted to said upper torso;
e. a first shaft extending from said first arm at its shoulder portion to rotatably support said first arm in said upper torso;
f. a second shaft extending from said second arm at its shoulder portion to rotatably support said second arm in said upper torso; and
g. actuating means in communication with said first and second shafts including
i. a central shaft within said upper and lower torsos said central shaft being fixed at one end to said lower torso;
ii. a first means in communication with said central shaft and said upper torso; and
iii. a second means in communication with said central shaft and said first and second shafts;
h. said actuating means permitting said upper torso to pivot relative to said lower torso and said first and second arms to swing simultaneously with said movement of said upper torso in a fighting motion when said actuating means is activated.

4,003,159

GAME CALL

Frank R. Piper, Delmont, Pa., assignor to Penn's Woods Products, Inc., Delmont, Pa.

Filed Jan. 12, 1976, Ser. No. 648,412
Int. Cl.² A63H *5/00*
U.S. Cl. 46—189 **5 Claims**



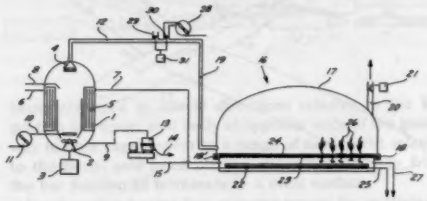
1. A game call comprising the combination of:
a unitary member consisting of a carrier and sounder board, said carrier including an elongated base and support arms projecting laterally above the opposed sides of said base to thereby define said carrier with a generally U-shaped cross section,
said sounder board having a generally U-shaped cross section formed by an elongated planar sounder head having a planar top face coextending with and lying between two sounder arms, said sounder arms being connected to the support arms of said carrier by web sections in such a manner to define an open-ended sound slot by a gap formed between the U-shaped configurations of said carrier and said sounder board,
an elongated striker plate adhered to the top face surface of said sounder head, and
means for vibrating said striker plate and thereby said sounder board to radiate an audible sound corresponding to a sound made by wild game from said open-ended sound slot.

4,003,160

PROCESS FOR GROWING CHLOROPHYLLOSE PLANTS USING CARBON DIOXIDE AND HEAT GENERATED IN EXOTHERMIC AEROBIC FERMENTATION PROCESSES

Hans Müller, Im Almendli, Erlenbach, Zurich, Switzerland

Continuation-in-part of Ser. No. 551,348, Feb. 20, 1975, abandoned. This application Feb. 24, 1976, Ser. No. 661,118
Claims priority, application Switzerland, Mar. 14, 1974, 3687/74; June 25, 1974, 8804/74
Int. Cl.² A01G *31/02*
U.S. Cl. 47—58 **3 Claims**



1. A continuous process for growing chlorophyllose plants or vegetation in a greenhouse which comprises
a. aerobically cultivating a yeast in a nutrient medium in a fermentor,
b. continuously controlling the temperature of the nutrient medium in the said fermentor during the fermentation by heat exchange with a coolang passing through a heat exchanger in contact with the nutrient medium in the said fermentor,
c. continuously passing the effluent coolant from the said heat exchanger to a second heat exchanger that is located in the greenhouse below the surface of a layer of liquid that is located below a bed of chlorophyllous plants that are growing in the said greenhouse,
d. continuously passing the nutrient medium in which the yeast cells have been grown from the fermentor into a separator,
e. separating the yeast cells from the liquid portion of the nutrient medium in which the yeast cells have been grown in the said separator and recovering the said yeast cells,
f. continuously passing the said liquid portion of the nutrient medium from which the yeast cells have been separated into and through the greenhouse below the bed of chlorophyllous plants that are growing in the said greenhouse and into contact at least with roots of the plants growing in the said bed,
g. continuously passing the carbon dioxide that is generated during the cultivation of the yeast from the fermentor into the atmosphere of the greenhouse, and
h. harvesting the plants that have been grown in the said bed in the said greenhouse.

4,003,161

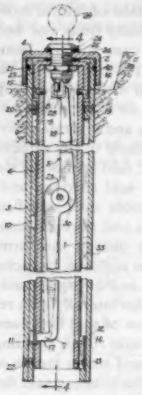
MECHANICAL BARRIER

Wesley A. Collins, 1315-C Via Santiago, Corona, Calif. 92720

Filed Mar. 1, 1976, Ser. No. 662,477
Int. Cl.² E01F *13/00*
U.S. Cl. 49—35 **2 Claims**

1. A temporary barrier which comprises:
a ground imbedded receptacle comprising an outer tube with a short upper section extending above ground, a sleeve fastened to the inside of said outer tube having a plurality of holes at various depth positions forming mortised areas;
a movable post comprising a tubular enclosure slidably engaged into said sleeve, a cap closing the upper section of said enclosure, a lever pivotally mounted within said enclosure, a bolt at the lower part of said lever engaging

said mortised areas, actuating means in the upper part of said lever and of said cap, a larger concentric cap fas-



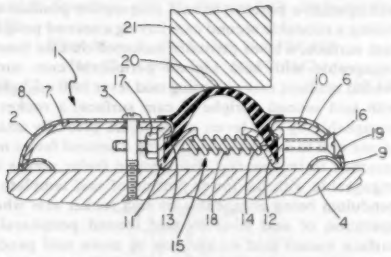
tened above said cap and fitting the upper end section of said outer tube.

4,003,162

DISCOVERY IN ADJUSTABLE THRESHOLDS AND METHODS OF MAKING AND USING THE SAME

Robert E. Britt, No. 11 Cumberland, Maryland Heights, Mo. 63042

Filed June 2, 1975, Ser. No. 582,979
Int. Cl.² E06B 1/70
U.S. Cl. 49—468 1 Claim



1. An adjustable threshold for use in door openings comprising,

first and second separate elongated partial threshold sections, each of said sections provided with elongated recesses disposed such that they open towards the space between said sections,

fastening means to secure said first section to the floor of said door opening,

elongated flexible and resilient center section means operably coupled to said first and second sections and disposed therebetween said center section provided with elongated hook means along its edges adapted to secure with said recesses,

adjusting means operably coupled to said first and second sections and disposed therebetween comprising bolt means extending through said first and second section means, nut means at one end thereof and spring means operably disposed about said bolt means and between said first and second sections.

4,003,163

DOOR CONSTRUCTION

Gerhard R. Schmidt, Nierfeldstr. 2, 5804 Herdecke (Ruhr), Germany

Filed May 27, 1975, Ser. No. 581,282
Claims priority, application Germany, May 29, 1974, 2426290
Int. Cl.² E06B 3/70
U.S. Cl. 49—503 8 Claims

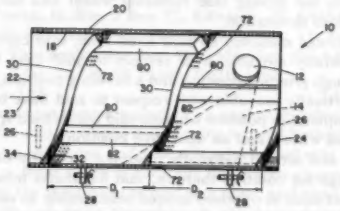
1. A door construction adapted to have fittings such as hinge plates, a lock, and the like mounted thereon, said construction comprising a core member formed of chip plate, said core member having cylindrical bores extending inwardly from the edge surfaces thereof at positions corresponding to those at which said fittings are to be mounted, a cylindrical hardwood plug seated in each of said bores, said core member having at least one rabbeted edge, and an outer layer of veneer adhesively bonded directly to the surfaces of said core member and to said rabbeted edge.

4,003,164

WORKPIECE TREATING BARREL

James H. Carpenter, Jr.; Charles H. Bradley, and Bernard W. Ixer, all of Hagerstown, Md., assignors to The Carborundum Company, Niagara Falls, N.Y.

Filed Apr. 22, 1974, Ser. No. 463,073
Int. Cl.² B02C 17/02; B24C 3/26
U.S. Cl. 51—13 18 Claims



1. An abrasive blast-resistant barrel for use in blast treatment of workpieces such as metal castings and the like; said blast-resistant barrel being constructed of a wear resistant material for withstanding the impact of abrasive particles and the like incident to a blast treatment of said workpieces and being generally tubular and including an inner wall and an outer wall; said barrel having a hollow interior, an open first end for passing a series of workpieces into said barrel and an open second end for passing workpieces out of said barrel; workpiece pushing means constructed of a wear-resistant

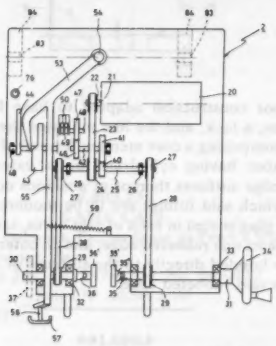
material for withstanding the impact of abrasive particles and the like disposed on said inner wall for pushing each of said workpieces along the length of said barrel from adjacent said first end toward and out of said second end; said workpiece pushing means including a leading face portion on a side thereof disposed toward said open second end for engaging workpieces and pushing said workpieces toward said open second end and a trailing face portion on a side thereof disposed toward said open first end; the improvement comprising said trailing face portion being inclined in a direction toward said open second end for allowing workpieces to move upwardly and over said trailing face portion toward said open second end.

4,003,165

MACHINE FOR BEVELING LENSES

Antonio Angaron Saun, Hospitalet De Llobnegat, Spain, assignor to Proptic, S.A., Barcelona, Spain

Continuation-in-part of Ser. No. 520,142, Nov. 1, 1974, abandoned. This application July 8, 1975, Ser. No. 594,038
Claims priority, application Spain, Nov. 2, 1973, 420190
Int. Cl.² B24B *13/04*
U.S. Cl. 51—101 LG **6 Claims**



1. A machine for beveling lenses by accomplishing a rough grinding stage and beveling stage upon said lens comprising:

a fixed base,

a reducing wheel rotatably mounted on said fixed base for accomplishing said reducing stage,

a beveling wheel rotatably mounted on said fixed base in juxtaposed relation to said reducing wheel for accomplishing said beveling stage,

means for driving said reducing wheel and said beveling wheel in rotation,

a carriage mounted on said fixed base, said carriage being laterally movable with respect to said base between a rough grinding position and a beveling position, and being vertically movable with respect to said base between an inoperative position wherein said lens is held spaced from said wheels and an operative position,

first and second halfshafts mounted coaxially on said carriage for rotation thereon, said halfshafts terminating in first ends in opposed spaced relationship to one another, each of said first ends having lens holding means attached thereto for cooperating together to hold a lens to be beveled, said first halfshaft being adjustably movable axially with respect to said second halfshaft so that a lens can be held clamped between the pair of said lens holding means, said second halfshaft having a template mounted thereon, said halfshafts being so located on said carriage as to hold a lens generally vertically aligned with said grinding wheel and said beveling wheel,

motor means operatively connected to said halfshafts for selectively rotating said halfshafts,

first carriage moving means for moving said carriage laterally between said rough grinding position and said beveling position comprising a rotatable first cam having first and second side cam surfaces spaced from one another along the direction of lateral movement of said carriage, and spaced radially from one another on said first cam, said first side cam surface being associated with said rough grinding position and said second side cam surface being associated with said beveling position, said first cam being mounted on a first shaft, an arm pivotally mounted on said carriage and extending across said carriage generally perpendicularly to the direction of lateral movement of said carriage, said arm being movable in a plane generally parallel to said carriage and comprising a follower portion engageable with said first and second side cam surfaces and an end portion terminating in a feeler, first resilient means biasing said arm toward said first and second side cam surfaces, an inclinable guide mounted on said fixed base and engaging said feeler, said guide positioning said feeler laterally with respect to said fixed base, whereby rotation of said first cam causes said carriage to move between said rough grinding position and said beveling position, and motor means operatively connected to said first shaft for rotating said first shaft in synchronized relationship with said halfshafts whereby said halfshafts make at least a portion of one revolution with said follower portion in contact with said first side cam surface and then at least a portion of a revoluation with said follower portion in contact with said second side cam portion,

second carriage moving means for moving said carriage vertically from said operative position to said inoperative position comprising a raised first peripheral cam surface on the periphery of said first cam, a roller mounted on said base and engageable by said first peripheral cam surface to cause said carriage to move from said operative position to said inoperative position when engaged by said first peripheral surface, whereby when said first cam is rotated to the point where said first peripheral cam surface engages said roller, said carriage is moved to said inoperative position,

third carriage moving means for moving said carriage from said operative position to said inoperative position comprising a rotatable second cam having a second peripheral cam surface, a lever pivotally mounted on said base and engageable with said second peripheral cam surface, second resilient means biasing said lever into engagement with said second peripheral cam surface, a rocker arm engageable by said lever, a pendulum pivotally attached at one end to said base and having a second feeler means attached to its free end, said second feeler means being engageable with the lower portion of said template, said pendulum being engageable by said rocker arm whereby operation of said lever by said second peripheral cam surface causes said rocker arm to move said pendulum and said second feeler means upwardly to engage said template and thereafter move said carriage upwardly to said inoperative position, and

switch means for controlling said motor means for driving said halfshafts and said first and second cams, said switch means being mounted on said pendulum and being operated when said feeler means contacts said template to incrementally rotate said halfshafts and said cams.

4,003,166

LOADING APPARATUS FOR A MACHINE TOOL

Toshihito Kawamura, Kariya, Japan, assignor to Toyoda Koki Kabushiki Kaisha, Japan

Filed Sept. 15, 1975, Ser. No. 613,521
Claims priority, application Japan, Sept. 14, 1974, 49-105527
Int. Cl.² B24B *47/10*
U.S. Cl. 51—215 HM **7 Claims**

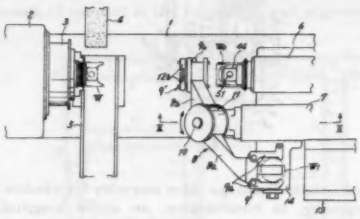
1. A loading apparatus for loading non-circular workpieces

upon a spindle chuck rotatably supported upon a headstock of a machine tool, comprising in combination:

charging means spaced from said headstock and provided with a charging way extending parallel with the axis of said spindle chuck for charging said workpieces in a single line;

shutter means provided at the advanced end of said charging means and operable to be selectively opened and closed for preventing selected ones of said workpieces from further advancing;

shifting means disposed in co-axial alignment with said spindle chuck and shiftable toward and away from said



spindle chuck for facilitating mounting of said non-circular workpieces upon said spindle chuck;

a transfer arm pivotably provided for transferring said non-circular workpieces from said charging means to said shifting means and shiftable along an axis parallel with said shifting means for delivering a non-circular workpiece to said shifting means while at the same time receiving another non-circular workpiece from said charging means, said transfer arm having a pair of grippers at the opposite ends thereof; and

angular adjusting means for correcting the angular disposition of said workpiece gripped by one of said grippers disposed at the side of said charging means.

4,003,167

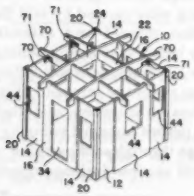
CABIN CONSTRUCTION

Reginald E. Saunders, 620 W. Diamond St., Philadelphia, Pa. 19122

Filed Mar. 3, 1975, Ser. No. 554,455

Int. Cl.² E04B *7/02;* **E04C** *2/42*

U.S. Cl. 52—92 **18 Claims**



1. In a cabin construction, the combination of

A. a plurality of side panels arranged in vertical edge-overlapping relationship to form a cabin side,

1. each side panel having a first edge, a second edge, and a top edge,

a. at least some of said side panels being provided with a plurality of vertically spaced holes, a first plurality of said holes being spaced inwardly from the first edge and a second plurality of said holes being spaced inwardly from the second edge,

b. the first edge of at least one panel overlapping and being joined to the second edge of the next adjacent side panel,

c. at least some of said first plurality of holes being aligned with some of said second plurality of holes of an adjacent panel to receive fasteners therethrough;

B. a plurality of cabin sides being arranged in edge to edge relationship to define an enclosed space; and

C. a plurality of roof rafters arranged in parallel and intersecting relationship,

1. the roof rafters resting upon and being supported by at least some of said side panels at the top edges thereof,

2. the roof rafters defining the top margins of the said enclosed space.

4,003,168

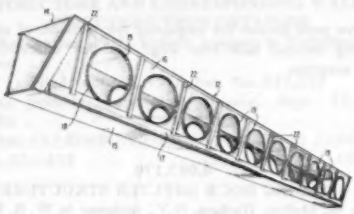
CRANE BOOM OF TRAPEZOIDAL BOOM SECTIONS HAVING REINFORCING RINGS

Rupert J. Brady, Bethesda, Md., assignor to Walter Kidde & Company, Inc., Clifton, N.J.

Filed June 27, 1975, Ser. No. 590,854

Int. Cl.² B66T *11/00;* **E04H** *12/34*

U.S. Cl. 52—118 **5 Claims**



1. In a crane boom, a boom section having top, bottom and side plates structurally joined to provide a boom section having a cross sectional form of an inverted trapezoid; continuous, longitudinally extending side plate stiffeners joined to said bottom plate and side plates and being substantially vertical and extending for a portion only of the height of the side plates, relatively large openings in the side plates at spaced points therealong and located above said stiffeners in close proximity to the top longitudinal edges of the stiffeners, and reinforcing ring elements positioned within said openings and being joined to said side plates around the peripheral edge of said openings, the outer peripheral surface of the bottom of said ring elements substantially resting on the top edges of the stiffeners and being structurally joined thereto, whereby stresses on the boom section are transmitted diagonally from the top plate to the side plate, circumferentially around the ring to the side plate stiffeners.

4,003,169

ANCHOR SYSTEM

Elliott B. Young, II, Rte. 1 Box 77, Edwards, Ill. 61554

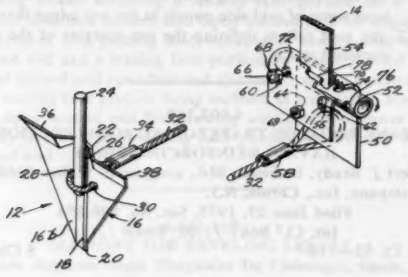
Continuation-in-part of Ser. No. 332,255, Dec. 12, 1974, abandoned. This application Jan. 12, 1976, Ser. No. 648,570

Int. Cl.² B66F *13/00;* **E02D** *5/80*

U.S. Cl. 52—155 **7 Claims**

1. An anchoring system including an anchor member comprising a solid wedge-shaped head having top and bottom sides bounded by a rear edge and two side edges, said side edges tapering to a front point, a centrally positioned channel extending from the front point to said rear edge, said head being provided with two holes therethrough, the holes being substantially equally spaced from the centroid of said head and from said channel, a rod-like neck secured to one side of said head within said channel, so that a portion of said neck protrudes beyond said rear edge, wherein at least part of the rear portion of said head is bent so as to form at least one wing along at least a portion of said rear edge, said wing being positioned on each side of said channel, a self-tightening clamp comprised of an essentially J-shaped clamp member provided with a plurality of apertures extending therethrough and at least one elongated opening extending therethrough, a strap securing shaft provided with a plurality of apertures, and

at least one elongated opening therein, bolt means for securing said shaft within said clamp member, a cable attached to and extending between said anchor member and said clamp,



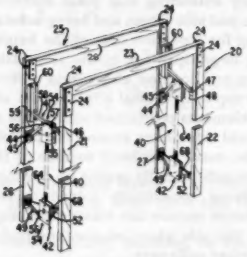
and drive pole means for engaging the portion of said neck extending beyond said rear edge and for embedding said anchor member.

4,003,170

LOADING DOCK SHELTER STRUCTURE

Charles W. Mellyn, Hudson, N.Y., assignor to W. B. McGuire Co., Inc., Hudson, N.Y.

Filed Oct. 15, 1975, Ser. No. 622,676
Int. Cl.² E04F *10/04*
U.S. Cl. 52—173 DS **13 Claims**



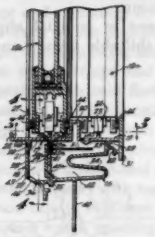
1. In a truck dock shelter including a substantially rigid front frame member comprising a header element and spaced apart upright side frame elements for supporting cover material over space at a dock door opening and for carrying upright face panels for engagement by a truck end being docked opposite said opening, and extension means normally holding said frame member in an outward position away from support structure adjacent to said opening yet enabling said panels to be displaced toward said opening by said truck end, the improvement wherein said extension means comprise yieldably biased means connected pivotably with and supporting each of said side frame elements at at least two vertically spaced locations thereon which are displaceable toward said opening either together or independently of one another under pressure from said truck end so that said face panels will conform to any posture of said truck end relative to said opening, said yieldably biased means including for each said side frame element upper and lower sets of arms each of which sets comprises an inner arm and an outer arm pivotably interconnected to define an angle therebetween and having respective ends thereof pivotably connected with said support structure and the related side frame element, and means interconnecting the said sets of arms for applying oppositely to them in common a force constantly urging the arms of each of said sets toward a more open angular position.

4,003,171

HYDROSTATIC WATER DISCHARGE VALVE FOR WINDOW FRAME SILLS

Henry W. Mitchell, Miami, Fla., assignor to Crossley Window Co., Inc., Miami, Fla.

Filed July 3, 1975, Ser. No. 592,943
Int. Cl.² E06B *7/14*
U.S. Cl. 52—209 **5 Claims**



1. A hydrostatic discharge valve assembly for window frame sills comprising, in combination, an upper longitudinally-extending sill section, a lower longitudinally-extending sill section and inner and outer sill wall sections, said upper, lower, inner and outer sections together defining a coextensive enclosure, a vertical, longitudinally-extending partition wall dividing said enclosure into a longitudinally-extending water chamber between said partition wall and said inner wall section and an air-balance chamber between said partition wall and said outer wall section, a weep opening in said upper sill section for the drainage of condensate water into said water chamber, means controlled by water draining through said weep opening for discharging water collected in said water chamber into said air-balance chamber, and a discharge opening in said lower sill section and communicating with said air-balance chamber for discharging water to the outside of said lower sill section, said water draining controlled water discharging means comprising a water outflow through opening in a lower end portion of said partition wall, a flap member, means for swingably mounting an upper end portion of said flap member against the air-balance chamber side of said partition wall and in vertical alignment with said through opening so that said flap member will normally rest in face-to-face relation against said partition wall for blocking flow through said through opening, and a substantially horizontally disposed actuating vane carried by said flap member along an upper end portion thereof and extending into said water chamber directly below said weep opening, whereby the force of window frame sill drainage water falling through said weep opening and upon said vane serves to break the adhesive force of water film tension between said flap member and said partition wall to permit outward swinging of said flap member for water drainage through said partition wall through opening and said lower sill section drainage opening.

4,003,172

PERIPHERALLY GROOVED BUILDING BLOCKS IN A WALL CONSTRUCTION

Walter S. Pawl, 2844 Powder Mill Road, Adelphia, Md. 20783

Filed Sept. 30, 1975, Ser. No. 618,024
Int. Cl.² E04B *2/72;* **E04C** *1/10, 2/46*
U.S. Cl. 52—279 **4 Claims**

1. A wall construction of concrete blocks assembled without a binder therebetween and comprising a plurality of linear wall segments each comprising a double layer of blocks with the blocks in one layer overlapping the blocks in the other layer both horizontally and vertically,

said blocks having identical horizontal sections with the inner faces of blocks in one layer having alternate and equal vertically co-extensive dove-tail grooves and ridges slidably interlocked with similar vertical coextensive

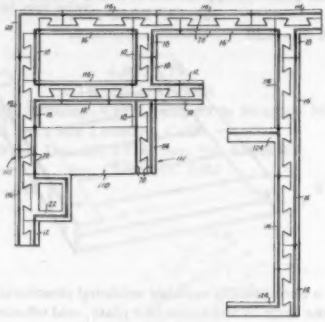
dove-tail grooves and ridges in the inner faces of the blocks in the other layer,

a corner wall segment comprising corner blocks having a plurality of angularly extending block portions joined to the linear wall segments,

the corner block portions each having an identical half groove and half ridge interlocked in a running fit with the inner faces of end blocks of the linear wall segments,

two spaced linear wall segments having a beam supported between them at points normally provided for a block in each of said wall segments,

said beam having end faces formed like the interlocking inner faces of the blocks which they replace at their points of support in the respective wall segments,



the dove-tail grooves and ridges on said blocks having planar faces which are positioned in face-to-face relationship when interlocked to define a close yet free fit without any noticeable play between interlocked blocks so that the wall is assembled without a binding agent between blocks,

each block and beam end in said wall construction having a peripheral undercut groove extending completely around its face edges, the edge grooves of adjacent blocks forming undercut double groove channels along the joints, holding non-adhesive resilient packing strips for sealing without binding said joints and providing some frictional sliding movement between load-bearing surfaces of the blocks limited by the lateral clearances between their interlocking faces.

4,003,173

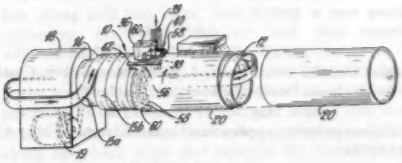
WALL CONSTRUCTION

Kevin M. Foley, Toledo; Harold A. Dewhurst, and Frank P. McCombs, both of Granville, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Sept. 29, 1975, Ser. No. 617,353

Int. Cl.² E04C *2/16*

U.S. Cl. 52—309.17 **10 Claims**



1. A wall consisting essentially of:

a. a thermosetting resin cured and comprising from about 30 to 40 percent by weight of said wall;

b. glass fibers randomly oriented and substantially uniformly distributed through said resin, comprising from about 10 to 20 percent by weight of said wall;

c. a filler uniformly distributed in said resin comprising about 15 to 60 percent of said wall;

d. inorganic cement; and

e. at least one polyhydric phenolic compound

wherein the resin is phenol-formaldehyde condensate or a phenol-amino compound-formaldehyde condensate formed in the presence of the cement and the polyhydric phenolic compound,

wherein the resin and cement have a weight ratio of resin to cement ranging from 1:9 to 9:1 based on the dry weight of cement and the weight of resin solids, and

wherein the polyhydric phenolic compound and the phenol in the resin have a mole ratio polyhydric phenolic compound to phenol ranging from 1:10 to 10:1.

4,003,174

METHOD OF MOUNTING A COMPOSITE WALL STRUCTURE AND CORRESPONDING WALL STRUCTURE THUS OBTAINED

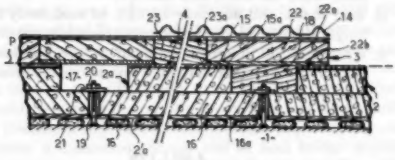
Michel Kotcharian, Paris, France, assignor to Technigaz, Paris, France

Filed Sept. 26, 1975, Ser. No. 617,237

Claims priority, application France, Sept. 27, 1974, 74.32739

Int. Cl.² E04B *2/00*; E04F *13/08*; E04G *21/00*

U.S. Cl. 52—415 **18 Claims**



1. A method of making a composite wall structure comprising a rigid self-supporting outer wall, and at least one layer of juxtaposed lining elements substantially parallel to and secured to said outer wall, each one of said lining elements being previously provided on that of its faces which will face towards said outer wall with a deformable and non resilient compound having the consistency of a thick paste and settable in a hardened condition and wherein the improvement consists in the steps of rigidly securing abutment means to said outer wall, that face of said lining elements which faces towards said outer wall abutting on said abutment means, regularly distributing and arranging said compound in patches over the whole surface area of said face according to an at least approximately regular network-like pattern with polygonal meshes, then applying it against said outer wall; causing then said patches to be squashed and flowed by moving each lining element to a predetermined final position defined by said abutment means so that said compound lies in the space left between said outer wall and said lining elements; allowing said compound to set with a view to rigidly securing each lining element into said predetermined final position to said outer wall; and completing the fastening of each lining element in said predetermined final position by the actuation of mechanical fastening means.

4,003,175

FASTENER AND ROOF ARRANGEMENT USING THE FASTENER

Francis Joseph Patry, Lewiston, Maine, assignor to Johns-Manville Corporation, Denver, Colo.

Filed June 30, 1975, Ser. No. 591,585

Int. Cl.² E04B *1/38*

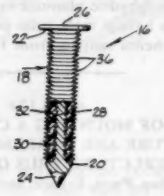
U.S. Cl. 52—506 **3 Claims**

1. A fastener comprising:

a. a substantially solid plastic longitudinal body having a front end portion of predetermined maximum outer cross-section, said outer portion extending from said front end to said back end, said outer portion including,

i. a plurality of integral longitudinally adjacent outer circumferential ribs located in plane normal to the axis of said body, said ribs together extending the length of said outer portion;

b. a pointed metal tip affixed to the front end of said body, said tip having a maximum outer cross-section less than



the predetermined maximum outer cross-section of the outer portion of said body;

c. an integral longitudinal shank having a cross-section less than the cross-section of said body and longitudinally shorter than said body, said shank extending into said body from the front end thereof;

d. said shank and an inner surface of said body including longitudinally interlocked complementary serrations; and

e. a plastic head integrally connected with the back end of said body, said head having a greater outer cross-section than said body.

4,003,176

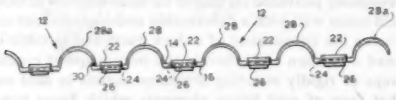
ROOF TILE SYSTEM

Richard A. Shumway, 681 St. Clair St., Eau Gallie, Fla. 32935

Filed July 24, 1975, Ser. No. 598,576

Int. Cl.² E04D *1/00, 3/362*

U.S. Cl. 52—539 **9 Claims**



1. A roof covering system comprising:

an array of panels, each panel comprising a unitary, molded member having first and second opposing, substantially parallel surfaces and first and second opposing ends, with each panel having a plurality of recesses along said first surface adjacent said first end thereof, and a plurality of protrusions from said second surface adjacent said second end, said first and second surfaces defining a plurality of arcuate portions in said panel, each one of said arcuate portions extending across said panel between adjacent ones of said recesses, and further extending across said panel between adjacent ones of said protrusions, said panels being overlapped end-to-end such that said protrusions in one panel extend into said recesses of another panel;

a plurality of support pads joined with each said panel, each said support pad positioned between said first and second ends and between adjacent ones of said arcuate portions and further extending from said first surface of the corresponding one of said panels;

one of said arcuate portions comprising an edge arcuate portion extending to one edge of said panel between said first and second ends;

a dam extending from said second surface along another edge between said first and second ends of each said panel, said panels disposed edge-to-edge such that said dam in one panel is overlapped by said edge arcuate portion of another panel.

4,003,177

HERMETICALLY SEALED SECTIONAL AND DETACHABLE PROTECTIVE COVERS

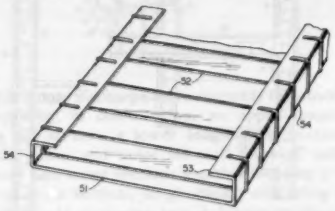
Francisco de la Concha, Refineria 18 de Marzo casa No. 21, Mexico 16, Mexico City, Mexico

Continuation of Ser. No. 401,963, Sept. 28, 1973, abandoned, which is a continuation of Ser. No. 187,089, Oct. 6, 1971, abandoned. This application Apr. 21, 1975, Ser. No. 569,654

Claims priority, application Mexico, Oct. 8, 1970, 122,590

Int. Cl.² E04C *2/32*

U.S. Cl. 52—630 **1 Claim**



1. In a hermetically sealable sectional structural cover member in the form of a channel-like plate, said member being free of perforations and comprising a longitudinally extending substantially planar web portion with upstanding, substantially planar longitudinal flange portions integral with and extending along opposite sides of said web portion, the improvement comprising:

two substantially planar lateral portions, the first one extending inwardly from the top of one of said flange portions and being integral therewith, and the second one extending inwardly from the top of the other of said flange portions and being integral therewith,

said lateral portions extending generally parallel to said web portion and overlying said web portion; and

reinforcing means in the form of corrugations for reinforcing said member against compression loading in the direction of said corrugations,

said corrugations extending continuously in the transverse direction along said web portion, along said upstanding longitudinal flange portions and along said lateral portions but terminating short of the free edges of said lateral portions so that said free edges form continuous straight lines over their respective lengths, thereby providing an efficacious sealing surface along these free edges,

said corrugations in said web portion, said flange portions and said lateral portions also providing a significant measure of flexibility to said member to facilitate deformation thereof in a direction transverse to said corrugations.

4,003,178

OPEN MESH METAL PANELS

Robert Charles Douthwaite, 2, Elloughton Grove, Castle Park, Cottingham, North Humberside, England

Filed May 13, 1975, Ser. No. 577,125

Claims priority, application United Kingdom, May 13, 1974, 21065/74

Int. Cl.² E04C *2/42*

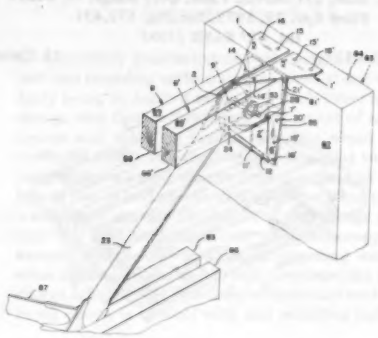
U.S. Cl. 52—664 **6 Claims**

1. A length or panel of welded wire rod mesh defined by longitudinal rods, equally spaced apart and transverse rods, equally spaced apart and, which panel is corrugated or deformed at spaced intervals such that rods extending in the same direction are off-set from the remaining rods parallel

thereto with deformation of the adjacent portions of the rods at right angles thereto, and a rigid metal member is inserted

through between the off-set rods and those parallel thereto at least adjacent one edge.

4,003,179
TRUSS HANGER
Tyrell T. Gilb, Berkeley, Calif., assignor to Simpson Manufacturing Co., Inc., San Leandro, Calif.
Filed Jan. 21, 1976, Ser. No. 650,848
Int. Cl.² E04C 3/02
U.S. Cl. 52—696 **8 Claims**

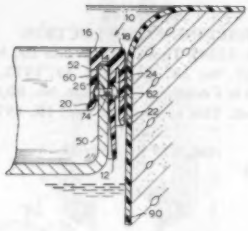


1. A truss hanger for connecting the end of a truss to an end support, said truss having two vertically spaced chords joined by a plurality of metal web members at joints by pin type connector means, said top chord comprising two parallel juxtaposed structural members, said hanger comprising:

a. a pair of sheet metal members placed in side by side relation each having:

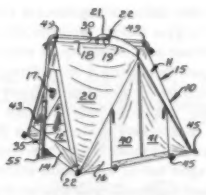
1. a generally planar side member mounted substantially vertically and having a generally straight and horizontal top edge, and a generally vertical back edge;
2. a top flange having a forward portion integrally connected to a substantial portion of said top edge adapted for bearing against the top edges of said top chord structural members and positioned at a generally right angle to said side member for rigidizing said side member along said top edge, and having a rear portion extending rearwardly beyond said side member adapted for bearing upon said end support;
3. a back flange integrally connected to substantially the entire length of said back edge of said side member and positioned at a generally right angle to said side member and said top flange for rigidizing said side member along said back edge and adapted for connection to said end support;
4. a tab member extending from said side member at right angles thereto forming a horizontal base for receiving said structural member forming the top chord of said truss and rigidizing a portion of the mid-portion of said side member; and
5. an opening formed in said side member between said tab member and said top flange adapted for receipt of said pin type connector means.

4,003,180
EDGE MOLDING
Peter C. Messuri, 7824 Biltmore Blvd., Miramar, Fla. 33023
Filed Apr. 8, 1976, Ser. No. 674,835
Int. Cl.² E04F 19/02
U.S. Cl. 52—716 **11 Claims**



1. Trim molding for being coupled by a fastener over the edge section of a surface, said trim molding comprising: an elongated strip of relatively flexible material, said strip being generally T-shaped in cross-section, with a stem section thereof coupled to said surface by said fastener communicating therethrough, and wherein a bridge section of said strip includes a distended first end displaced from said stem section sufficient to overlap said edge section of said surface, with said bridge section having a first flange integrally formed at said first end thereof, said first flange extending in the same direction as said stem section and of a cross-sectional length sufficient to overlap a first end of said fastener adjacent thereto, and wherein a distended second end of said bridge section includes having a second flange integrally formed therewith for extending in the same direction as said stem section, with said second flange having a sufficient cross-sectional length to communicate with and overlap a second end of said fastener adjacent thereto, whereby said edge section of said surface and said end sections of said fastener are completely enclosed by said trim molding.

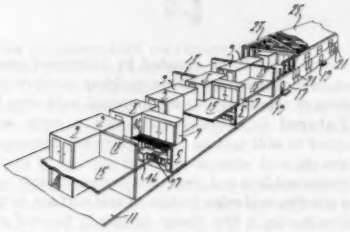
4,003,181
METHOD OF ERECTING A TENT STRUCTURE
Denis Wilson Robinson, Mercer Island, Wash., and George Benjamin Madison, Wichita, Kans., assignors to The Coleman Company, Inc., Wichita, Kans.
Division of Ser. No. 529,742, Dec. 5, 1974, Pat. No. 3,951,159.
This application Dec. 22, 1975, Ser. No. 642,785
Int. Cl.² E04G 21/12, 21/14
U.S. Cl. 52—745 **5 Claims**



1. In a method of erecting a tent having a bottom secured to the ground and a shell defining first and second intersecting ridges, each ridge extending between opposing upright side walls, the steps comprising: inserting a rigid ridge support through flexible connector means along said first ridge; inserting a flexible ridge support through flexible connector means along said second ridge; said steps of inserting further includ-

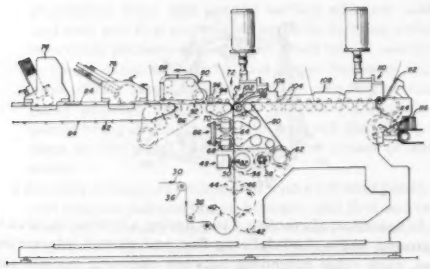
ing interconnecting said rigid ridge support with said flexible ridge support such that said flexible ridge support is carried by said rigid ridge support, each of said ridge supports extending substantially the entire length of its associated ridge; inserting an upright extensible support between the ground and each of said rigid ridge support, the length of each of said extensible supports being adjusted sufficient to support said rigid ridge support above the ground while not stretching taut said tent material; and then extending said extensible supports to stretch said tent taut.

4,003,182
BUILDING CONSTRUCTION
Albert L. Wokas, 22245 Thorofare, Grosse Ile, Mich. 48138
Division of Ser. No. 287,883, Sept. 11, 1972, Pat. No. 3,855,743, which is a continuation of Ser. No. 80,891, Oct. 15, 1970, abandoned. This application Dec. 19, 1974, Ser. No. 534,319
Int. Cl.² E04B *1/00*
U.S. Cl. 52—745 **1 Claim**



1. The method of constructing a building which comprises building at least portions of a plurality of rooms in a plurality of boxes wherein at least two of said boxes contain internal room structure for two rooms and each has hollow vertical walls separating said two rooms and having utility service lines in said hollow walls, setting the boxes on a foundation so that said hollow walls of said two boxes are substantially aligned and coplanar so that the service lines may cross from one box to another, thereafter erecting walls and ceilings and laying floors with said boxes as a core and with the outer sides of the boxes as part of said walls, and erecting a roof on the building.

4,003,183
METHOD OF ENCLOSING INSERT MATERIAL IN A CONTINUOUSLY ADVANCING ENVELOPE BLANK
Herbert W. Helm, Hollidaysburg, Pa., assignor to F. L. Smithe Machine Company, Inc., Duncansville, Pa.
Filed Oct. 16, 1974, Ser. No. 515,192
Int. Cl.² B65B *11/48*
U.S. Cl. 53—31 **9 Claims**



1. A method of enclosing insert material in a continuously advancing blank having a body portion and a bottom flap portion comprising,

conveying insert material along a first straight line path at a preselected speed,

continuously conveying a blank along a second straight line path to an intersection where a second straight line path intersects said first straight line path,

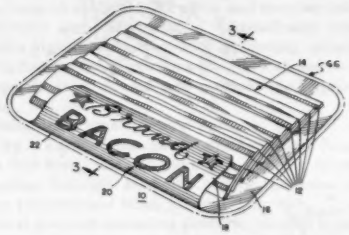
rotating a vacuum cylinder having vacuum ports thereon at a location adjacent to said intersection of said first straight line path and said second straight line path,

while said blank is being conveyed along said second straight line path, engaging the body portion of said blank to said vacuum cylinder by means of a negative pressure through said vacuum ports at a location on said blank adjacent said bottom flap portion and folding said blank bottom flap portion into overlying relation with said blank body portion,

inserting insert material between said blank body portion and bottom flap portion while said blank is being folded and conveyed, and

thereafter conveying said folded blank with said insert material positioned therein along a third straight line path substantially aligned with said first straight line path.

4,003,184
METHOD AND APPARATUS FOR PACKAGING SLICED BACON AND THE LIKE
Thomas B. Shiu, 131 Stirrup Lane, Burr Ridge, Ill. 60521
Filed Apr. 28, 1975, Ser. No. 572,431
Int. Cl.² B65B *11/08*
U.S. Cl. 53—32 **12 Claims**



1. A method of packaging sliced bacon strips arranged in shingled relation in a bacon shingle comprising the steps of first placing a shingle of sliced bacon on top of a body portion of a flat sheet of semi-rigid impervious styrene plastic material having an integral flap formed along a fold line between said body portion and said flap with an edge of said shingle closely adjacent said fold line, heating said plastic material only in a narrow trough formed along said fold line to an elevated bending temperature, folding said flap along said fold line over and downwardly toward an edge portion of said shingle of sliced bacon on said body portion and applying pressure to said fold line to effect a permanent set to said folded flap to permanently overlie said edge portion of said shingle of bacon.

4,003,185
CASER APPARATUS
Otis Ward Goff, 7151 Carlsbrook, Portage, Mich. 49081
Filed June 6, 1975, Ser. No. 584,266
Int. Cl.² B65B *57/14, 39/02*
U.S. Cl. 53—61 **14 Claims**

1. An apparatus for assembling a charge of a plurality of articles of similar size and shape and dropping said articles into a container at a controlled velocity, comprising:

frame means,

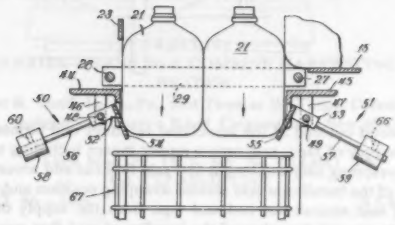
means for assembling a charge of said articles at a container-filling station,

article support means for supporting said articles until a full charge has been assembled, container support means for supporting at said container-filling station a container

adapted to receive said charge, and release means for releasing said charge of articles to permit it to fall into a container positioned therebelow on said support means; and

means entirely independent of said container for controlling the rate of fall of said articles thereinto to prevent damage thereto, comprising:

at least one retarder member comprising a supporting body pivotally mounted on said frame, an elongate member mounted on said supporting body supporting a weight mounted thereon, and means on said supporting body defining a retarding surface positioned to interrupt the fall of said charge by engaging an outwardly-positioned bottom edge of said charge, said weight being insufficient



to completely counterbalance the weight of said charge and said retarding surface and the pivot of said supporting body being so located relative to each other and to said charge that further downward movement of said charge causes said retarding surface to rotate about said pivot until said charge can slip past said retarding surface, said weight then causing said retarding surface to bear on a lateral side of said charge with sufficient force to retard to a safe value the rate of descent of said charge as it drops into the said container, said container support being located sufficiently below said retarding surface that when the charge is seated in said container, the top of said charge is below said retarding surfaces and said container never comes in contact with said retarding surfaces.

4,003,186

SEALING HEAD FOR A SEALING DEVICE ADAPTED TO BE USED FOR A CONTAINER

Anthonie Jacobus van Rede, Jacob Catslaan 38, Ulthoorn, Netherlands

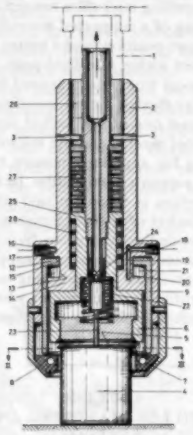
Filed Nov. 3, 1975, Ser. No. 628,410

Claims priority, application Netherlands, Nov. 8, 1974, 7414622

Int. Cl.² B65B *31/02*

U.S. Cl. 53—88 **5 Claims**

1. A sealing head for sealing a container comprising a tubular housing open at its lower end, said housing having an upper portion and a lower portion with the lower portion having a larger internal diameter than the upper portion, said lower portion being adapted to be disposed partly around the upper portion of a container to be sealed, a sealing ring support carried by the lower end of said housing and said sealing ring support having an inwardly tapered wall portion adapted to surround the upper end of the container to be sealed, a sealing ring carried by said sealing ring support on the inwardly tapered wall portion thereof, a pressing element carried within the lower portion of said housing for sliding said sealing ring downwardly along said inwardly tapered wall portion to seal



said ring against the container to be sealed, and means for evacuating air from the lower end of said housing.

4,003,187

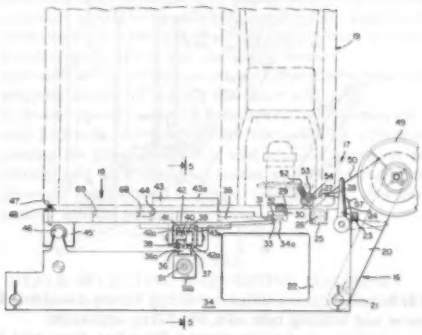
MICROFILM JACKET MICROFILM FEEDING DEVICE AND PROCESS

Paul A. Kiejzik, 2907 Monterey Court, Springfield, Pa. 19069

Filed Sept. 8, 1975, Ser. No. 611,004

Int. Cl.² B65B *63/00, 43/26*

U.S. Cl. 53—123 **9 Claims**



1. A device for inserting microfilm into a microfilm jacket, comprising in combination: jacket support means comprising a platform structure supportable of a microfilm jacket with an insert opening portion of a supported microfilm jacket at a predetermined support-position at substantially a predetermined edge of the platform structure, adapted such that a microfilm jacket edge portion anterior of a supported microfilm jacket's insert opening is suspended substantially without support whereby the microfilm jacket edge portion is susceptible to be flexed in an opening-direction away from and further exposable of its insert opening; and a microfilm inserter means including a film-guiding structure forming feed-path for microfilm and a rearward feed-opening of the film-guiding structure, positioned in a predetermined feed-position relative to and over-lapping said predetermined edge with said feed-path and said rearward feed-opening being alignable with said insert opening of a microfilm jacket supported at said predetermined support position and adapted such that at-least a

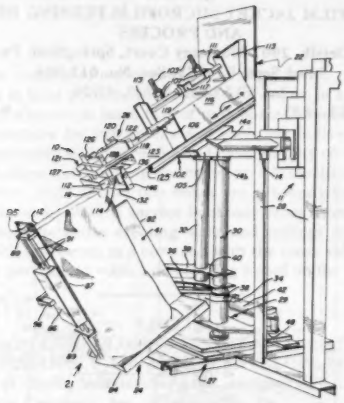
part of leading structure of the rearward feed-opening of the film-guiding structure thereof are positioned substantially within said insert opening, said microfilm inserter means being for mechanically impelling microfilm toward and in alignment with an insert opening of a supported microfilm jacket at said predetermined support-position; and a cutter means for severing microfilm situated within said feed-path, positioned anterior to and spaced-away from said rearward feed opening; and microfilm jacket edge-flexing means mounted in a fixed position relative to at least one of said jacket support means and said microfilm inserter means, and the microfilm jacket edge-flexing means being for applying pressure to the suspended edge portion of a supported microfilm jacket whereby the suspended edge portion is flexed in said opening direction, and said microfilm jacket edge-flexing means being further for anchoring the suspended edge portion by clamping pressure by said applying pressure whereby a supported microfilm jacket is thereby prevented from shifting and from slipping away from the microfilm inserter means when a film is being inserted from said feed-path into the aligned jacket insert opening.

4,003,188

VALVE BAG FILLER, HANDLING AND SEALING SYSTEM

Erwin M. Lau, Dolton, Ill., assignor to Black Products Company, Chicago, Ill.

Filed Nov. 24, 1975, Ser. No. 634,731
Int. Cl.² B65B *1/22*
U.S. Cl. 53—126 **17 Claims**



1. In combination with a valve bag having a sealable filling sleeve and a filling tube of a bag filling apparatus;

support means for removing a filled bag from said filling tube in substantially upright position,

means for settling the contents of said filled bag to a level below said sealable filling sleeve,

means for closing and sealing said sealable filling sleeve, and

means for folding an outer end portion of said sealed filling tube of said filled bag toward said bag.

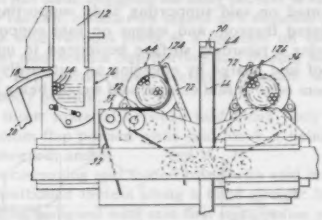
4,003,189

BUNDLING MECHANISM

Keith W. Little, Georgetown, and Barry C. Millar, Islington, both of Canada, assignors to Bundy Corporation, Detroit, Mich.

Filed Apr. 18, 1975, Ser. No. 569,483
Int. Cl.² B65B *13/02, 27/10*
U.S. Cl. 53—198 R **16 Claims**

1. A bundling mechanism including: means operable to support bundles of workpieces in first and second spaced wrapping positions, means operable to move a bundle from said first wrapping position to said second wrapping position, means for supporting a supply of adhesive-backed tape with an end length thereof extending between said wrapping positions peripherally of the bundles at said positions, and tape-wrapper means operable to sever said tape end length from the supply of tape between said wrapping positions and to define a first cut end at the severed end of said end length and



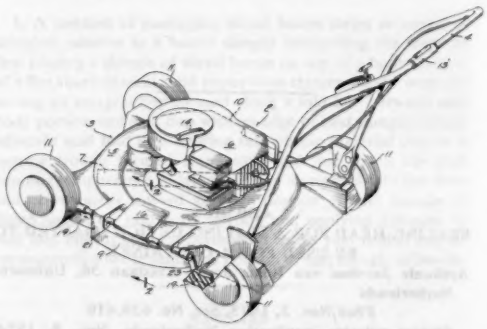
a second cut end at the associated resultant end terminating the supply of tape, said tape-wrapper means including means for wrapping said end length and said first cut end around the one of the bundles at said second wrapping position and wrapping said second cut end and tape from the supply of tape partly around the other of the bundles at said first wrapping position whereby each of the bundles is wrapped partly at said first wrapping position and completed with said end length as severed at said second wrapping position.

4,003,190

SAFETY DEVICE FOR WALK-BEHIND ROTARY MOWERS

Daniel E. Braun, Brookfield, and Joseph R. Harkness, Germantown, both of Wis., assignors to Briggs & Stratton Corporation, Wauwatosa, Wis.

Filed Aug. 7, 1975, Ser. No. 602,815
Int. Cl.² A01D *53/00*; F02N *11/08*
U.S. Cl. 56—10.5 **7 Claims**



1. In a walk-behind power lawn mower comprising a carriage mounted on wheels, an internal combustion engine on the carriage that has a manually energized starter and an electrical ignition system, a cutting element beneath the carriage that is driven for rotation by the engine, a skirt on the carriage that substantially surrounds the cutting element but has a clipping discharge outlet through which the cutting element can be contacted when it is rotating, and a guide handle projecting rearwardly and upwardly from the carriage for guiding the mower across the ground, safety means for preventing contact with the rotating cutting element by a person who starts the engine and uses the mower, said safety means comprising:

A. a treadle mounted on the carriage at a location adjacent

to the skirt but remote from its discharge outlet, said treadle being biased to a raised position and being arranged to be depressed by one foot of a person who has his other foot well spaced from said discharge outlet and who is in a position for starting the engine;

B. a first electric switch connected with said treadle to be actuated thereby and which has one condition when the treadle is in its raised position and an opposite condition when the treadle is depressed;

C. a second electric switch located at said handle and arranged to have one condition when the handle is not being gripped and an opposite condition when the handle is gripped; and

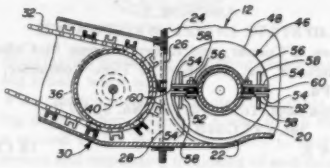
D. conductor means so connecting said switches with one another and in the engine ignition system that the ignition system is disabled unless at least one of said switches is in its said opposite condition.

4,003,191

BARRIER MEANS IN A COMBINE HARVESTING HEADER

Robert R. Todd, Leola, Pa., and Thomas W. Taege, Columbia, Mo., assignors to Sperry Rand Corporation, New Holland, Pa.

Filed Mar. 29, 1976, Ser. No. 671,647
Int. Cl.² A01D *45/02*
U.S. Cl. 56—14.6 **9 Claims**



1. A mobile combine having a threshing compartment, an elevator unit extending generally forwardly from the inlet end of said threshing compartment, and a header supported forwardly of the lower end of said elevator unit and extending transversely in opposite directions from the longitudinal axis of said combine, said header including a transverse auger of substantial length including a transversely-extending tube and flights fixed to said tube and respectively extending therealong from the outer ends of said header toward the center thereof, in combination with disc means mounted to a generally central portion of said auger tube between the inner ends of said flights thereon and operable to prevent axial movement of crop material from one of said flights past the central portion of said auger tube to the other of said flights, said disc means generally having a height relative to the height of the flights of said auger to provide a sharply defined barrier to said aforementioned axial movement of crop material between said flights and thereby assure relatively even feeding of crop material to said threshing compartment.

4,003,192

TOBACCO HARVESTER DEFOLIATOR HEAD HAVING A POSITIVE STALK GRIPPING ASSEMBLY

Bertram Lee Jordan, and John Davis Mitchell, both of Lewiston, N.C., assignors to Harrington Manufacturing Company, Lewiston, N.C.

Filed May 20, 1975, Ser. No. 579,194
Int. Cl.² A01D *45/16*
U.S. Cl. 56—27.5 **3 Claims**

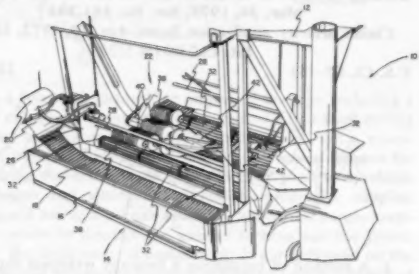
1. In an automatic tobacco harvester adapted to move through a tobacco field and harvest tobacco leaves from individual stalks of a tobacco row, a defoliator head assembly mounted on said harvester and carried thereby and comprising:

a. a frame structure;

b. defoliating means mounted on said frame structure for defoliating leaves from respective tobacco stalks of a row passing through a row opening defined between said defoliating means;

c. conveying means operatively associated with said defoliator head assembly for conveying the defoliated leaves from the defoliator head assembly;

d. stalk gripping means disposed below said defoliating means for engaging respective stalks as they pass through said defolitor means, said stalk gripping means including cooperative first and second driven belts disposed in side-by-side relationship wherein respective innermost segments of the belts are disposed adjacent each other where they cooperate to receive respective tobacco stalks therebetween, and wherein at least one of said driven belts includes projecting means in the form of a continuous series of spaced apart lugs disposed on the outer side thereof and particularly spaced to receive respective tobacco stalks therebetween as the stalks pass through said defoliating means such that the respective stalks are substantially encompassed by the innermost segment of said belts and respective lugs, whereby the projecting lugs generally co-act with said belts to generally stablize the stalks and prevent the stalks from moving back and forth longitudinally within said defoliator means;



e. hydraulic drive means operatively connected to said stalk gripping means for driving the same; and

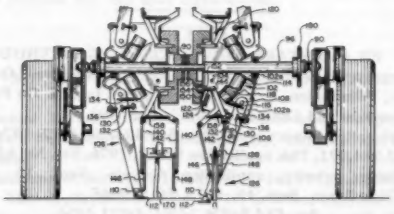
f. hydraulic speed control means operatively connected to said hydraulic drive means for continuously effectively sensing the ground speed of said tobacco harvester and driving said stalk gripping means at a horizontal speed generally equal and opposite said tobacco harvester ground speed.

4,003,193

STALK SELECTIVE HARVESTING MACHINE

Spencer Kim Haws, 88 W. 50 South, Centerville, Utah 84014

Filed Mar. 14, 1975, Ser. No. 558,349
Int. Cl.² A01D *45/00*
U.S. Cl. 56—327 A **33 Claims**



1. A machine for harvesting crops which grow in stalks or the like comprising

a frame adapted to be moved along the ground,

means mounted on said frame for detecting stalks of a selected height and in a selected pathway,

a first cutting assembly mounted on the frame to selectively rotate downwardly toward the ground to a cutting position beside a selected stalk and then upwardly away from the cutting position, said cutting assembly including cutting means movable to sever the selected stalk, and means for grasping the severed stalk and elevating it as the cutting assembly rotates upwardly, and

means mounted on the frame and responsive to said detecting means for actuating said cutting assembly to rotate.

4,003,194

METHOD AND APPARATUS FOR PRODUCING HELICALLY WRAPPED YARN

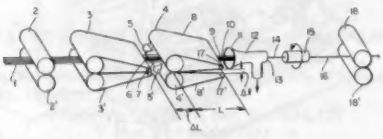
Seiichi Yamagata, and Kozo Susami, both of Otsu, Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Division of Ser. No. 459,396, April 9, 1974. This application Mar. 24, 1975, Ser. No. 561,304

Claims priority, application Japan, Apr. 10, 1973, 48-39991

Int. Cl.² D01H *5/28*

U.S. Cl. 57—51 **22 Claims**



1. A method of producing a helically wrapped yarn which comprises advancing a bundle of staple fibers, false twisting them to form a twisted bundle having a bundle axis, said staple fibers being false twisted substantially helically about said bundle axis, advancing a plurality of outside fibers adjacent to but separately from said false twisted bundle, said outside fibers being substantially parallel to said bundle axis, advancing said bundle and said outside fibers to a condition wherein both ends of substantially each of said outside fibers are free, uniting said outside fibers to said false twisted bundle and detwisting said bundle thereby helically wrapping said outside fibers around said bundle.

7. An apparatus for producing a helically wrapped yarn which comprises means providing a nip point, means for continuously supplying drafted staple fibers in a downstream direction to said nip point, means for imparting false twist downstream of the nip point to the advancing bundle of fibers, means for supplying and advancing substantially straight ahead a group of outside fibers downstream of the nip point, and then arranging said outside fibers substantially parallel to the path of downstream flow of the false twisted bundle but separate therefrom, uniting means for bringing the outside fibers downstream of the nip point closely adjacent to said false twisted bundle with said outside fibers separated from said bundle and with both ends of the outside fibers free of the nip point, whereby the detwisting of the false twisted bundle wraps said outside fibers helically around said detwisted bundle.

4,003,195

FILAMENTARY TOW PACKAGING METHOD

George Arvid Fernstrom, Seaford, and James Richard Osborn, Jr., Wilmington, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 505,493, Sept. 12, 1974, Pat. No. 3,944,071. This application Feb. 2, 1976, Ser. No. 654,280

Claims priority, application Canada, Sept. 10, 1975, 235383; Japan, Sept. 10, 1975, 50-109045

Int. Cl.² B65H *54/84;* **D02J** *1/04*

U.S. Cl. 57—157 F **11 Claims**

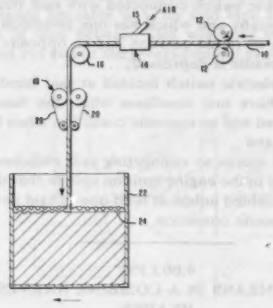
1. A method for delivering an advancing filamentary tow into a container to form a tow package, said method comprising:

applying alternate twist of varying helix angle to the tow;

forwarding the alternately twisted tow at a predetermined speed downwardly toward the container;

moving said container continuously with respect to downwardly moving tow at a speed of from about ⅛ to about 1/20 the forwarding speed of the tow to lay the tow down in layers of substantially vertical folds; and

increasing the varying helix angle applied to the tow by impacting the tow into the layers previously laid down.



4,003,196

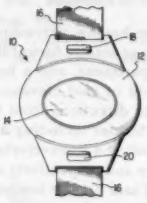
SOLID STATE LADIES' WRISTWATCH

Arthur Herman O'Connor, and Robert Eugene McCullough, both of Lancaster, Pa., assignors to Time Computer, Inc., Lancaster, Pa.

Filed Sept. 10, 1974, Ser. No. 504,770

Int. Cl.² G04B *19/24, 39/00*

U.S. Cl. 58—4 A **18 Claims**



1. A solid state wristwatch comprising a watch case, an electrically insulating frame mounted in said case, an electrically insulating substrate carried by said frame, a plurality of electro-optical digital display stations on one side of said substrate, a combination time and calendar integrated circuit chip on the other side of said substrate and electrically coupled to said display stations, said watch case including a viewing window adjacent said display stations elongated along the three o'clock – nine o'clock axis of said wristwatch, and a band pass optical filter in said window, said filter being arcuately curved about only one axis, which axis lies in the conventional 6 o'clock to 12 o'clock vertical plane through the center of the wristwatch.

4,003,197

WATCH MONITOR

Terry M. Haber, 3050 S. Bristol, No. 8C, Santa Ana, Calif. 92707

Filed June 9, 1975, Ser. No. 584,858

Int. Cl.² G04B *19/34*

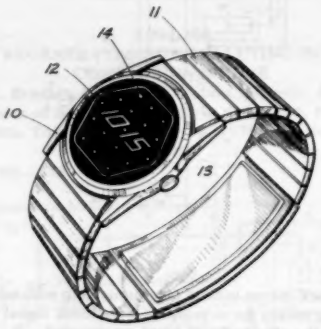
U.S. Cl. 58—50 R **8 Claims**

1. A watch including

a. a time indicating means;

b. a source of electrical energy;

c. a crystal oscillator circuit connected to said source for continuous energization;
d. divider circuit means connected to said crystal oscillator circuit for providing timing pulses to control said time indicating means.
e. light emitting means;
f. means in said divider circuit means for providing low frequency, low level current pulses derived from said crystal oscillator circuit and connected to said light emitting means for periodically energizing said light emitting means at said low frequency to provide an attention attracting blnking light on said watch;



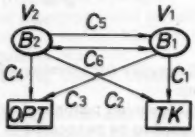
g. illuminating means for rendering visible said time indicating means when actuated;
h. a first switch means connected to actuate said illuminating means when closed by a user to tell the time; and
i. a second switch means connected to said light emitting means and responsive to closing of said first switch means to open and disconnect said light emitting means and responsive to opening of said first switch means to close and reconnect said light emitting means so that said blinking light stops during the period of time said first switch means is closed.

4,003,198

ELECTRONIC TIMEPIECE

Shigeru Morokawa, Higashiyamato, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Oct. 31, 1974, Ser. No. 519,557
Claims priority, application Japan, Nov. 13, 1973, 48-127481
Int. Cl.² G04C *21/16, 3/00*
U.S. Cl. 58—152 R **11 Claims**



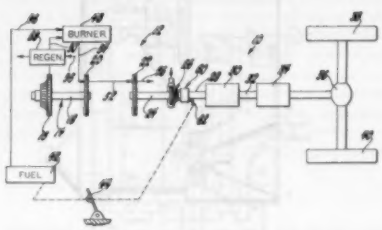
1. An electronic timepiece comprising: a main component of said timepiece, at least one electric cell for said main component; an optional component, at least one electric cell for said optional component; a connecting system having a switching element for selectively connecting in parallel said cells for said main and optional components to each other, means for detecting the difference in the terminal voltage between said cells and means for controlling said switching element in accordance with the signal from said difference detecting means.

4,003,199

TURBINE ENGINE WITH AIR BRAKE

Albert H. Bell, III, Birmingham, Mich., and Hans Egli, Santa Monica, Calif., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 1, 1976, Ser. No. 662,611
Int. Cl.² F02C *3/10, 7/02*
U.S. Cl. 60—39.16 R **4 Claims**



1. In a two-shaft gas turbine engine of the type including a gasifier compressor coupled on one end of a first shaft having a gasifier turbine on the opposite end thereof and a power turbine connected to a second shaft having means thereon for transferring power from the power turbine shaft to a vehicle transmission and wherein the gasifier compressor supplies compressed air to a burner assembly which discharges combustion products through the gasifier turbine and the power turbine, the improvement comprising: a rear bulkhead on the engine having a concave opening extending axially inboard of said engine, a portion of the power shaft extending axially through said opening, an air brake compressor mounted directly on the power turbine shaft within said opening, said air brake compressor having an inlet and an outlet, said compressor including an impeller having a hub with a radially outwardly curved surface extending from said inlet to outlet, a plurality of blades on said impeller secured to said curved surface, each of said blades having an inducer portion for directing flow from said inlet into said impeller, each of said blades having a segment downstream of and curved continuously from said inducer portion forwardly in the direction of impeller rotation and extending to the outlet, said downstream segment having a forward curvature at the outer periphery of said impeller in excess of 60° from a plane through the center of the impeller, inlet guide vanes in the inlet to said air brake compressor to control mass air flow to the compressor, said vanes having an open brake position and a partially closed run position, said vanes throttling the inlet air flow to the air compressor in the run position to cause limited air flow through the air brake compressor to maintain cooling thereof during run operation and reduced parasitic power losses, said vanes guiding greater mass air flow to said blades at said brake position and said downstream segments of said blades to produce a high level of specific work on said greater mass air flow to produce a ratio of brake power loss when the vanes are in a brake position to parasitic power loss when the vanes are in a run position not less than eight-to-one.

4,003,200

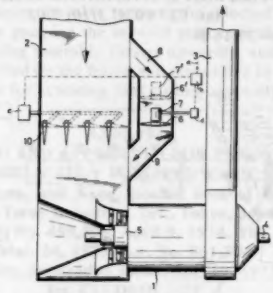
METHOD AND APPARATUS FOR COOLING TURBOMACHINES

Ferdinand Zerlauth, Andelfingen, Switzerland, assignor to Brown Boveri-Sulzer Turbomachinery, Ltd., Zurich, Switzerland

Continuation of Ser. No. 416,685, Nov. 16, 1973, abandoned. This application July 14, 1925, Ser. No. 595,490
Claims priority, application Switzerland, Nov. 17, 1972, 16576/72
Int. Cl.² F02C *7/00*
U.S. Cl. 60—39.02 **8 Claims**

1. A method of cooling a turbomachine having at least one

axial turbocompressor including a rotor and a plurality of vanes within a flow path through the turbocompressor, said method comprising the step of blowing a flow of pressurized gaseous medium into the turbocompressor for flow through



said flow path during shut-down of said turbocompressor in response to said rotor slowing to a reduced speed to maintain said rotor at said reduced speed until said rotor has cooled to a predetermined temperature.

4,003,201

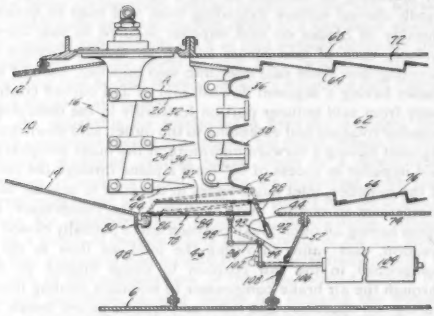
VARIABLE AREA FLAMEHOLDER DUCT

George D. Lewis, North Palm Beach; Norman W. Mangum, Jr., Palm Beach Gardens, and James P. Rusnak, North Palm Beach, all of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed July 31, 1975, Ser. No. 600,531

Int. Cl.² F02C 7/22

U.S. Cl. 60—262 **7 Claims**



1. An air breathing reaction propulsion engine, said engine having a combustion chamber with combustion occurring in said chamber at subsonic air velocities, fuel injection means for injecting fuel into said combustion chamber, flameholder means in said combustion chamber, a variable area exhaust nozzle, a wall of said combustion chamber being movable to vary the effective flow area of the combustion chamber across the flameholder, a portion of said wall being located in radial alignment with said flameholder.

4,003,202

VARIABLE FEEDBACK STEERING SYSTEM

Lanson Becker, Galesburg, Mich., assignor to General Signal Corporation, Rochester, N.Y.

Filed Mar. 11, 1976, Ser. No. 665,824

Int. Cl.² F15B 13/12

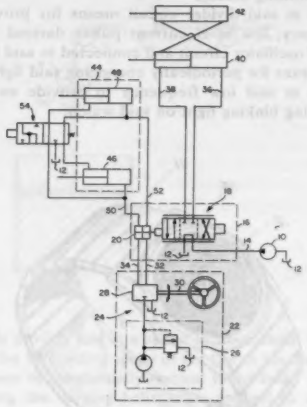
U.S. Cl. 60—385 **8 Claims**

1. A hydraulic control circuit comprising:

a. a source of pressurized fluid;

b. means for apportioning said pressurized fluid between a plurality of paths;

c. input means in fluid communication with said apportioning means for changing the apportioning of said pressurized fluid;



d. feedback means in fluid communication with said apportioning means for developing a feedback signal to counteract the effect of said input means; and

e. means in fluid communication with said feedback means for varying said feedback signal to thereby vary the rate of counteracting said input signal.

4,003,203

HYDRAULIC EXCITER OF VIBRATIONS FOR A VIBRATORY COMPACTOR

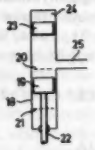
Gulertan Vural, Emmelshausen, Germany, assignor to Koehring GmbH - BOMAG Division, Boppard, Germany

Division of Ser. No. 372,622, June 22, 1973, Pat. No. 3,849,986. This application Nov. 25, 1974, Ser. No. 527,051

Claims priority, application Germany, June 24, 1972, 2231106

Int. Cl.² F15B 7/02

U.S. Cl. 60—537 **1 Claim**



1. An hydraulic exciter for vibrations for a vibratory compactor comprising:

relatively movable exciter piston and cylinder means, one of which is adapted to be connected to a compacting member for transmitting power thereto as said piston means moves relative to said cylinder means;

means for delivering to said piston and cylinder means a pressure medium producing a pressure which varies cyclically at a selected frequency in a manner to cause relative vibratory movement between said piston means and said cylinder means; and

means including a cylinder, a free piston in said cylinder and having one side in communication with the pressure medium, and a mass of gas under pressure disposed in said cylinder at the side of said free piston opposite from

that in communication with the pressure medium, said free piston undergoing movement counter to that of said exciter piston and having a natural frequency of movement under the influence of the cyclically varying pressure, which natural frequency of movement is determined by the pressure of the gas in said cylinder, for influencing the relative movement of said exciter piston and cylinder means to produce movement of said exciter piston and said free piston at a resonant frequency of said exciter, which resonant frequency is substantially equal to the selected frequency of the cyclic pressure variation of the pressure medium.

4,003,204

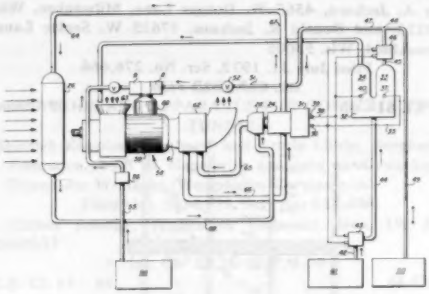
FUEL REGENERATED NON-POLLUTING INTERNAL COMBUSTION ENGINE

Curtis E. Bradley, 4517 Calle Ventura, Phoenix, Ariz. 85018

Division of Ser. No. 456,974, April 1, 1974, Pat. No. 3,939,806. This application Oct. 6, 1975, Ser. No. 620,021

Int. Cl.² F01K *23/10*

U.S. Cl. 60—618 **2 Claims**



1. In an internal combustion engine of the turbine type,

a. a turbine block providing a combustion chamber,

b. an exhaust pipe extending from said block and communicating with said combustion chamber;

c. a closed system for a working fluid including a pump for circulating the working fluid through the system, a turbine which is operated by the working fluid when in a gaseous state and a condenser for returning the working fluid from a gaseous state to a liquid;

d. a heat exchanger disposed about said exhaust pipe and through which said closed system passes to derive heat from the exhaust pipe and heat the working fluid;

e. a generator driven by said turbine to produce a DC electric current;

f. an electrolysis cell containing water and connected to said generator so that the DC current therefrom decomposes the water into oxygen and hydrogen;

g. a water tank for supplying water to said electrolysis cell;

h. a fuel intake on said turbine block and communicating with said combustion chamber;

i. a hydrogen metering control communicating with said fuel intake;

j. a conduit extending from said electrolysis cell to said hydrogen metering control which conveys hydrogen from the cell to the metering control;

k. a fuel tank for a hydrocarbon fuel;

l. a hydrocarbon fuel metering control on said fuel intake communicating with said combustion chamber and connected to said hydrocarbon fuel tank;

m. linkage connected to said metering controls operable to vary the ratio of hydrogen and hydrocarbon fuel which is introduced into the combustion chamber of said turbine block, and

n. an air intake on said block and communicating with said combustion chamber.

4,003,205

METHOD AND APPARATUS FOR OPERATING A STEAM TURBINE PLANT HAVING FEED WATER HEATERS

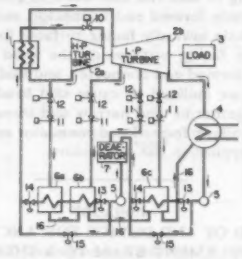
Jube Matsumura, Hitachi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 7, 1975, Ser. No. 602,723

Claims priority, application Japan, Aug. 9, 1974, 49-90825

Int. Cl.² F01K *7/38*

U.S. Cl. 60—646 **15 Claims**



1. Rapid load limiting apparatus for a steam turbine plant having a turbine driven by steam from a boiler and feed water heaters in which feed water supplied to the boiler is preheated by steam extracted from the turbine, said apparatus comprising: means for detecting drain water level in the feed water heater, control means for automatically reducing the amount of steam supplied to the turbine when the drain level in the feed water heater reaches an abnormal level and stopping the extraction of steam from the turbine to the feed water heater.

4,003,206

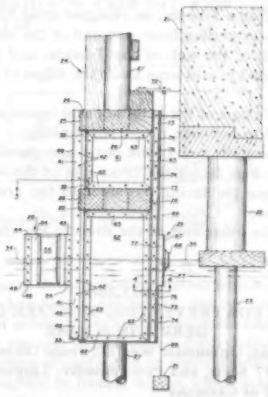
UNIVERSAL END CONNECTOR FOR FLOATING BOOM

Neeld D. Tanksley, Antioch, Calif., assignor to Pacific Pollution Control, Inc., Emeryville, Calif.

Filed Aug. 20, 1975, Ser. No. 605,978

Int. Cl.² E02B *15/04*

U.S. Cl. 61—1 F **12 Claims**



1. In a universal end connector for releasably coupling together aligned ends of a floating boom or the like, said end connector including a connector body formed with a first side adapted for mounting to an end of a floating boom and a second side formed for releasable coupling to another end connector, the improvement comprising:

said second side being formed as a yoke-like bifurcated side having a pair of spaced apart neck portions each termi-

nating in enlarged head portions, said neck portions and said head portions defining therebetween a throat and an enlarged cavity, said throat and cavity being formed for mating receipt of a head portion and a neck portion on a similarly formed end connector with the head portion of said similarly formed end connector positioned in said cavity and the neck portion thereof extending outwardly through said throat, said throat and said cavity being open at at least one of a top and a bottom end thereof to permit positioning of said end connector in coupled relation to said similarly formed end connector, said head portions each include inwardly facing surfaces formed to engage oppositely facing surfaces on the head portion of said similarly formed end connector, and said inwardly facing surfaces are inclined to cause said head portions to be pulled together to tend narrow said throat when coupled to said similarly formed end connector and a longitudinal force is applied to the connectors.

4,003,207

METHOD OF AND DEVICE FOR ANCHORING A REINFORCEMENT BEAM TO A SHEET PILING

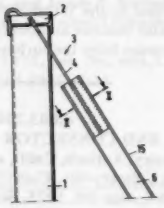
Ludwig Müller, Heinrich-Heine-Strasse, 44-46, 355 Marburg an der Lahn, Germany

Filed Oct. 28, 1975, Ser. No. 626,113

Claims priority, application Germany, Dec. 19, 1974, 7442205[U]

Int. Cl.² E02D *5/74*

U.S. Cl. 61—39 **5 Claims**



1. A method of securing a driven-into the ground reinforcement beam to a sheet piling, said method comprising the steps of:

first providing a T-beam, an elongate strap having a lengthwise slot extending from one end of the strap and fitting the width of the web of the T-beam, and a pair of rigid bars welded to said strap along the edges of said slot in the strap;

then driving part of the length of said beam into the ground adjacent to one side of the sheet piling;

then inserting the web of the beam into the slot of the strap with the bars facing the cross arm of the beam;

then welding the facing bar sides to the cross bars of the beam; and

securing the other end of the strap to the sheet piling.

4,003,208

ASSEMBLY FOR PREVENTING THE FALL OF DUST AND DEBRIS IN A MINE

Gerd Hornung, Opmunder Weg 14; Franz Disse, Deventerweg, both of 477 Soest, and Peter Rössler, Lippestrasse 49, 470 Hamm, all of Germany

Filed Sept. 2, 1975, Ser. No. 609,614

Claims priority, application Germany, Sept. 3, 1974, 2442177

Int. Cl.² L21D *19/00*

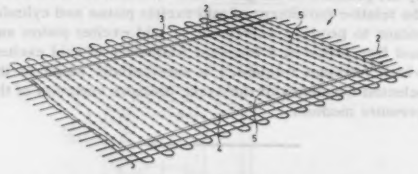
U.S. Cl. 61—45 D **9 Claims**

1. An assembly for preventing the falling of dust and debris from the roof and from the break of a mine, said assembly comprising:

a. a shield support structure having roof bars,

b. a roof covering disposed between the roof of the mine and the roof bars,

c. said roof covering including a welded wire-netting sheet having longitudinal and transverse wires with a dust-tight



web welded in between and at points of intersection of said longitudinal and transverse wires, and

d. said longitudinal wires being disposed on one side of the web and said transverse wires being disposed on the other side of the web.

4,003,209

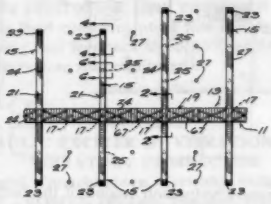
PIER CONSTRUCTION

Gary A. Jackson, 4565 W. Donges Lane, Milwaukee, Wis. 53223, and Donald R. Jackson, 17625 W. Senlec Lane, Brookfield, Wis. 53005

Filed July 31, 1972, Ser. No. 276,666

Int. Cl.² E02B *3/20*

U.S. Cl. 61—48 **9 Claims**



1. A method of constructing a pile supported pier comprising the steps of sinking a plurality of piles in general alignment, prefabricating a plurality of cross supports with hangers at one end, locating on each of said piles one of the cross members, moving the cross members on the piles to locate the cross members in aligned parallel relation to one another, fixing the aligned cross members to the respective piles in aligned position, and securing a deck assembly to the hangers.

4,003,210

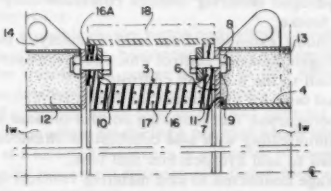
PIPELINE OF ASSEMBLED FIELD UNITS OF PIPE ELEMENTS AND METHOD OF INSTALLING SAME

Theodore Bostroem, 460 Park Road Extension, Middlebury, Conn. 06762

Filed Dec. 31, 1974, Ser. No. 537,643

Int. Cl.² F16L *1/01*

U.S. Cl. 61—105 **6 Claims**



1. A prefabricated field unit of assembled pipe elements comprising

a plurality of assembled pipe elements arranged in longitudinal alignment thereby to form a self-supporting pipeline,

a shell surrounding each pipe element and spaced therefrom, said shell being comprised of top and bottom shell sections welded at their adjoining faces to form an integral shell assembly, said bottom shell section having associated therewith means for supporting said pipe, said shell having an even number of walls which number at least six, and said top and bottom shell sections comprising trough and cover parts each of which has one half of the number of walls of the entire shell; said trough and cover parts being welded at their adjoining ends;

foam plastic material within the space between said pipe and shell for heat insulating the pipe and creating buoyancy of the field unit, and

a flexible joint extending between and fixedly attached to adjoining pipe elements.

4,003,211

METHODS AND APPARATUS FOR CONSTRUCTING TUNNELS

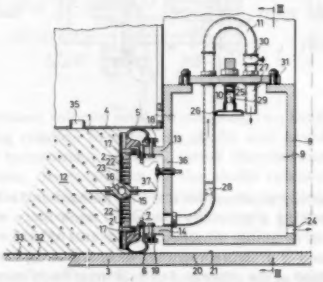
Heinrich Klapdor, Hamburg, and Armin Löbbe, Bergkamaan-Oberaden, both of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Westphalia, Germany

Filed Oct. 14, 1975, Ser. No. 622,575

Claims priority, application Germany, Dec. 19, 1974, 2460033

Int. Cl.² E01G *5/08, 5/16*

U.S. Cl. 61—84 **16 Claims**



1. A method of constructing a tunnel comprising operating fluid rams to advance a shield in a manner known per se;

installing a pre-fabricated lining section generally rearwardly of the shield relative to the direction of advancement of the shield, said lining section being spaced from the wall of the tunnel to define a space bounded by filter means;

introducing fluid concrete into said space; and

withdrawing water from the concrete through the filter means by suction acting on the filter means, wherein a thrust ring is utilized as an abutment for the rams and the thrust ring at least partly defines a chamber on the side of the filter means remote from the concrete, the pressure in said chamber being reduced to draw the water through the filter means and into said chamber, and wherein the rams are operated to shift the thrust ring in the direction of advancement after the water has been withdrawn and prior to advancement of the shield.

4,003,212

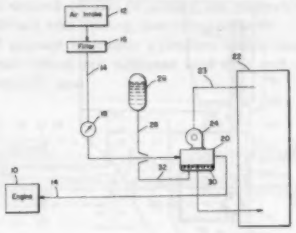
AIR CONDITIONING SYSTEM FOR AIRCRAFT

Robert C. Kinsell, Los Angeles; James C. Noe, Canoga Park, and Carl D. Campbell, Cerritos, all of Calif., assignors to The Garrett Corporation, Los Angeles, Calif.

Filed Aug. 29, 1975, Ser. No. 609,129

Int. Cl.² F25D *17/06, 17/04;* **B60H** *3/04;* **F25B** *27/00*

U.S. Cl. 62—91 **8 Claims**



1. A method of cooling an enclosure of a vehicle having a propulsion engine intake means for providing air for an engine, and throttling means for reducing the pressure of the air said method comprising the steps of introducing a liquid into the reduced pressure air, passing the air and liquid through one side of a heat exchanger for absorption of heat by vaporization of the liquid, circulating air from the enclosure through an other side of the heat exchanger for cooling, condensing liquid in said other side of the heat exchanger, and transporting said condensed liquid for introduction into said reduced pressure air.

4,003,213

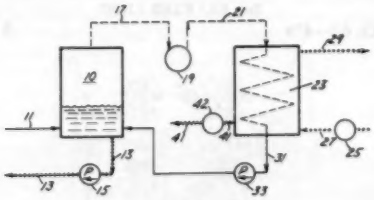
TRIPLE-POINT HEAT PUMP

Robert Bruce Cox, 19 Joan Court, Centerport, N.Y. 11721

Filed Nov. 28, 1975, Ser. No. 636,036

Int. Cl.² B01D *9/04;* **C02B** *1/12;* **F25B** *27/02, 13/00*

U.S. Cl. 62—124 **13 Claims**

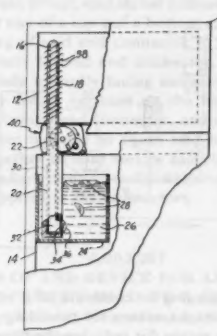


1. A heat pump or refrigeration system which comprises: an evaporation chamber; a condenser; means for introducing water or water solution into said evaporation chamber; means for creating a vacuum in said evaporation chamber sufficient to cause a portion of said water or water solution to vaporize and another portion to freeze; means, which may be the same means as is employed for creating said vacuum, for withdrawing and compressing vapor produced within said evaporation chamber and transferring the compressed vapor to said condenser; means for exchanging the heat content of said compressed vapor with a working fluid, thereby condensing said vapor; means for discharging said condensed vapor or returning said condensed vapor to said evaporation chamber and means for continuously removing ice from said evaporation chamber.

4,003,214
AUTOMATIC ICE MAKER UTILIZING HEAT PIPE

Frank A. Schumacher, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Dec. 31, 1975, Ser. No. 645,627
Int. Cl.² F25C 1/08
U.S. Cl. 62—340 10 Claims



1. In a refrigeration apparatus which includes a first compartment maintained at below-freezing temperatures and a second compartment maintained at above-freezing temperatures, an automatic ice maker which comprises:

conduit means extending between and having portions positioned within said first and second compartments;

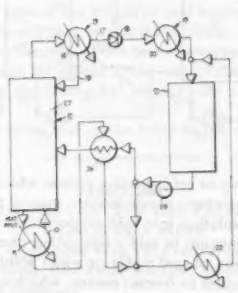
means for providing water adjacent the portion of said conduit means positioned within said second compartment; and

means positioned within said conduit means for alternately permitting and preventing heat transfer between said portions of said conduit means positioned within said first and second compartments.

4,003,215
ABSORPTION REFRIGERATION SYSTEM

John Robert Roach, Adelaide, Australia, assignor to University of Adelaide, Adelaide, Australia

Filed June 20, 1975, Ser. No. 588,805
Claims priority, application Australia, June 24, 1974, 7945/74
Int. Cl.² F25B 15/00
U.S. Cl. 62—476 6 Claims



1. In an absorption refrigeration system utilizing a pair of fluids, said system comprising:

a distillation column,

a distillation column heat exchanger for introducing heat into the distillation column for distilling one of said fluids from the other said fluid to form a distilled fluid and a distillation residue,

a condenser heat exchanger in fluid flow communication with said distillation column and arranged for condensing of the distilled fluid to produce a condensate,

an expansion valve through which passes said condensate,

an evaporator heat exchanger for evaporation of the condensate,

an absorber and an absorber heat exchanger in fluid flow communication with said evaporator heat exchanger, wherein the evaporated condensate is absorbed into the distillation residue to thereby form a liquid mixture, said absorber heat exchanger being arranged to maintain the vapour pressure in the absorber, below the vapour pressure in the distillation column, and

means to effect re-cycling of said liquid mixture within the system,

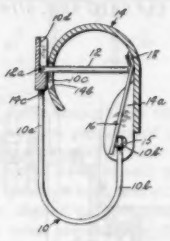
the improvement wherein each fluid of said pair of fluids is a fluorocarbon compound having refrigerant properties, said fluids having different boiling points, and the absolute difference between respective boiling points of said fluids, at a given pressure, lies in the range of 30°–60° C,

and the system operates (a) at a temperature for said condenser heat exchanger which is higher than is required when the boiling point difference is other than 30°–60° C and (b) with a grade of heat in said distillation column heat exchanger which is lower than is required when said boiling point difference is other than 30°–60° C.

4,003,216
EARRING STRUCTURE

Anthony Robert Cecere, 60 Fox Place, Hicksville, N.Y. 11801, and William McTighe, 220 E. 17th St., New York, N.Y. 10003

Filed Mar. 18, 1976, Ser. No. 667,913
Int. Cl.² A44C 7/00
U.S. Cl. 63—12 5 Claims



1. An earring structure for use with pierced and non-pierced ears comprising a generally U-shaped main body member, a pivotal post rotatably attached to one end of said main body member and a pressure member defining an aperture rotatably attached at the other end of said main body member, said main body member being arranged and adapted to encircle the lower portion of said ear, said one end for rising along one face of said ear and said other end for rising along the other face of said ear, said pivotal post standing up from and generally continuing said one end and said pressure member bearing against said other face when used with a non-pierced ear and said pivotal post extending through said aperture and ear when used with a pierced ear.

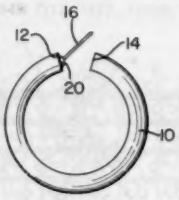
4,003,217
EARRING CONSTRUCTION

Andrew J. Evans, Greenville, R.I., and Ira Nason, Sharon, Mass., assignors to E. A. Adams & Son, Inc., Pawtucket, R.I.

Filed June 3, 1976, Ser. No. 692,596
Int. Cl.² A44C 7/00
U.S. Cl. 63—12 9 Claims

1. An earring for a pierced ear having spaced aligned ends forming a gap for the insertion of an ear lobe, securing means

adapted to pass through the ear lobe opening and bridge said gap to mount the earring on the ear, means for mounting one end of said securing means in one end of said earring, said mounting means permitting universal swiveling movement of



said securing means, and means for positioning and for holding a free end of said securing means in the opposite end of said earring after the insertion of said securing means through the ear lobe.

4,003,218

CONSTANT VELOCITY UNIVERSAL JOINT

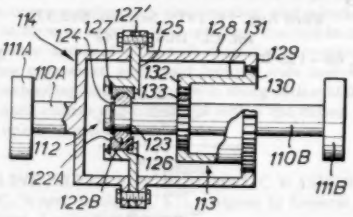
René Filderman, Asnieres, France, assignor to Societe Anonyme Francaise du Ferodo, Paris, France

Filed Apr. 8, 1975, Ser. No. 566,112

Claims priority, application France, Apr. 17, 1974, 74.13386

Int. Cl.² F16D 3/30

U.S. Cl. 64—21 **12 Claims**



1. A constant velocity joint for coupling two shafts and for transmitting rotation between the shafts, and enabling independently transmission of axial thrust therebetween and/or slight angular displacements of the shafts relative to their position of axial alignment: comprising, in combination, two stub shafts adapted to be fixed respectively to shafts to be couples, means for transmitting axial thrust between said stub shafts including ball and socket joint means through which said stub shafts effectively bear against each other, and a plurality of cooperating internally and externally toothed gears coupling said stub shafts for rotation and meshing with clearance for enabling slight angular displacements of said stub shafts relative to their axially aligned position, said plurality of gears including, at least, one internally toothed gear mounted for rotation with a first said stub shaft and one externally toothed gear mounted for rotation with the second said stub shaft, thereby providing constant velocity rotation between said stub shafts.

4,003,219

HYDRAULICALLY OPERATED RETRACTABLE SPINDLE

James T. Stull, Jackson Township, Butler County, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Apr. 21, 1975, Ser. No. 570,062

Int. Cl.² F16D 3/06

U.S. Cl. 64—23 **4 Claims**

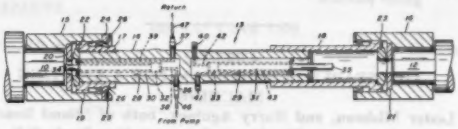
1. The combination, with driven and driving instrumentalities, of a removable spindle connecting said instrumentalities for transmitting rotational movement of said driving instrumentality to said driven instrumentality, said spindle comprising:

a shaft;

first and second hubs mounted on said shaft adjacent opposite ends thereof to rotate therewith, said shaft being axially movable with respect to said second hub;

first and second couplings joining the respective hubs with said driven and driving instrumentalities;

first and second hydraulic cylinders within said shaft near the ends which are adjacent said first and second hubs respectively; and



normally retracted first and second reciprocable pistons and piston rods within the respective cylinders;

said first piston rod bearing against said driven instrumentality for pushing said shaft toward said driving instrumentality when projected from said first cylinder and disengaging said first coupling from said driven instrumentality;

said second piston rod bearing against said driving instrumentality for pushing said shaft toward said driven instrumentality when projected from said second cylinder and re-engaging said first coupling with said driven instrumentality.

4,003,220

KNITTING MACHINE INCLUDING ROTATABLE HOLD DOWN RING

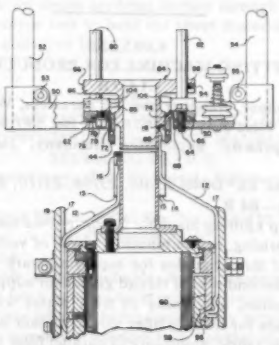
John C. Greczin, Philadelphia, Pa., assignor to Knitting Machinery Corporation of America, Philadelphia, Pa.

Continuation-in-part of Ser. No. 333,969, Feb. 20, 1973, Pat. No. 3,879,961. This application Jan. 20, 1975, Ser. No. 542,613

The portion of the term of this patent subsequent to Apr. 29, 1992, has been disclaimed.

Int. Cl.² D04B 9/00

U.S. Cl. 66—9 A **5 Claims**



1. In a circular knitting machine of the type having stationary portions and rotating portions and having a stationary needle bed and knitting needles vertically reciprocal relative to the needle bed, the combination of

A. a yarn guide holder positioned above the needle bed,

1. said yarn guide holder being secured to the rotating portions of the machine and having rotary motion relative to the needle bed;

B. a hold down ring secured to the yarn guide holder and being rotated therewith above the needle bed;

1. the hold down ring including a needle guide portion which is contacted by the knitting needles as they vertically reciprocate; and

C. attaching means to affix the hold down ring to the yarn guide holder to cause the hold down ring to rotate relative to the needle bed and the knitting needles during all periods of machine operation, whereby the contacts of the knitting needles will cause even wear about the needle guide portion.

4,003,221

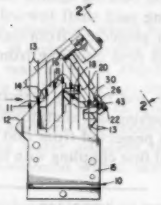
ADJUSTABLE CUSHION CAM FOR A KNITTING MACHINE

Lester Mishcon, and Harry Agulnek, both of Miami Beach, Fla., assignors to The Singer Company, New York, N.Y.

Filed Nov. 12, 1975, Ser. No. 631,339

Int. Cl.² D04B *15/32*

U.S. Cl. 66—57 **4 Claims**



1. In combination with needle controlling camming for a knitting machine, on cam supporting section block means, the camming including an adjustable stitch cam and including a cushion cam to limit the travel of needles drawn by the stitch cam, a (movable) member pivotably mounted in the section block means to position the cushion cam below the stitch cam, and spring means biasing said member into engagement with the stitch cam, said member being movable by the stitch cam when the stitch cam is adjusted in one direction and being movable by the spring means when the stitch cam is adjusted in the opposite direction such that a constant gap is maintained between the stitch and cushion cam in various adjusted positions of the stitch cam.

4,003,222

WARP KNITTING MACHINE FOR PRODUCING LOOPED CLOTH

Roland Wunner, Hauptstrasse 30, Bernstein, Wald, Germany

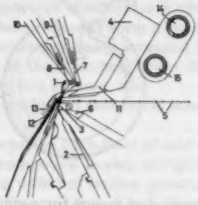
Filed July 21, 1975, Ser. No. 597,901

Claims priority, application Germany, July 23, 1974, 2435312

Int. Cl.² D04B *23/06, 23/08, 23/10, 23/12*

U.S. Cl. 66—84 R **3 Claims**

1. A warp knitting machine for producing looped or ripple-cloth comprising, in combination, a row of vertical needles, a first row of thread guides for supplying warp thread to said needles, a second row of thread guides for supplying pile yarn to said needles, a plurality of trick plates with knock-over edges, means for feeding filler thread to said needles for producing basic fabric, a plurality of parallel filler threads extending over the entire width of the fabric to be produced and being prepared to arrive horizontally at the level of upper edge of said trick plates, a plurality of pole sinkers disposed above and extending over and around the knock-over edges of said trick plates and secured to a bar slidably mounted on bearings, means for controlled reciprocating shifting of said bar in a direction parallel to the filler threads, said pole sinkers being adapted to form loops of the pile yarn to be interconnected with the basic fabric being produced simultaneously therewith, a plurality of filler sinkers extending into the space between said trick plates and said needles and movably mounted below said pole sinkers, and means for imparting to



said filler sinkers a substantially rectangular movement consisting of horizontal and vertical sections in timed relationship with the needle action, said filler sinkers being adapted to separate one filler thread at a time and transport it to the front side of said needles along the lower edges of said pole sinkers.

4,003,223

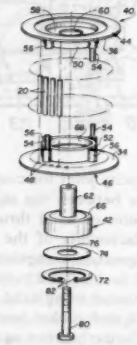
REPLACEMENT KNITTING MACHINE FEED WHEEL

Robert Joseph Vossen, 35 E. Woods Drive, Huntington, N.Y. 11743

Filed Aug. 11, 1975, Ser. No. 603,333

Int. Cl.² D04B *15/48*

U.S. Cl. 66—125 R **2 Claims**

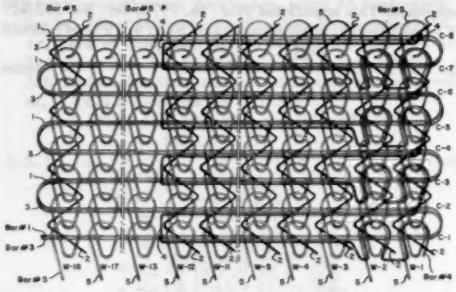


1. An improved knitting machine feed wheel for replacing an embodiment thereof worn out from use in feeding yarn from a supply source to a knitting station of said machine, said replacement feed wheel comprising only a partially complete feed wheel construction consisting of a yarn-supporting body operatively arranged in spanning relation between a cooperating pair of first and second housing members, one said housing member having a centrally located cylindrical wall bounding a bearing compartment sized to receive in seated relation therein a bearing salvaged from said worn out feed wheel, said salvaged bearing being operatively disposed within said bearing compartment to complete said construction of said replacement feed wheel, said cylindrical wall having a groove therein extending substantially the entire circular extent thereof and located on the remote side of said bearing in its said seated position within said bearing compartment, and a flexible C-ring disposed in a snap fit in said groove for holding said bearing in place during subsequent yarn feeding service of said wheel.

4,003,224
WARP KNIT ELASTIC FABRIC HAVING RAVEL RESISTANT FEATURES

Carl J. Odham, Asheboro, N.C., assignor to Stedman Corporation, Asheboro, N.C.

Filed Apr. 12, 1976, Ser. No. 676,373
Int. Cl.² D04B 7/12, 9/12, 11/08, 23/08
U.S. Cl. 66—193 6 Claims

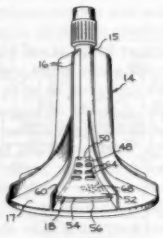


1. An elastic warp knit fabric comprising a plurality of base yarns each knitted in successive courses to form a plurality of successive closed loops extending in a warp direction and to form a plurality of individual wales including at least one locking wale and at least one intermediate wale, an elastic yarn laid into at least one intermediate wale and at least one locking wale, a first filler yarn extending in a weft direction in each course and contained within the closed loops of adjacent wales to connect adjacent wales together, and a locking yarn knitted to form an open loop in alternate courses in each said locking wale and laid in a weft extending direction in the remaining courses of each said locking wale and having a portion extending in a weft direction along with said first filler yarn in each course and contained within the closed loops of at least one intermediate wale.

4,003,225
LINT FILTER FOR AUTOMATIC WASHER

Joseph C. Worst, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Jan. 7, 1976, Ser. No. 646,984
Int. Cl.² D06F 39/10
U.S. Cl. 68—18 FA 9 Claims



1. A lint filter agitator assembly adapted to be submerged in a body of washing liquid and oscillated therein to effect a cleansing of fabrics placed within said liquid and entrapment of any lint in the washing liquid, comprising:

a. a driving member,

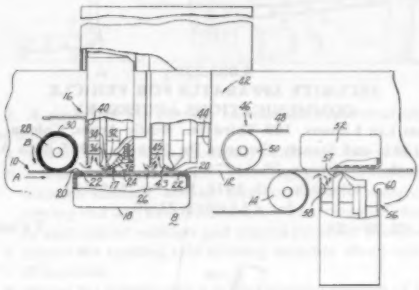
b. an agitator secured to the driving member having an upper centerpost, a lower flared base portion, at least two agitating vanes carried on the flared base portion for agitating the fabrics within the liquid, and

c. a removable filter member mounted on the exterior of the agitator in the area of the flared base portion and recessed between the agitator vanes, said filter member and agitator forming a chamber therebetween, said filter member having a liquid inlet at the upper end toward the centerpost to allow washing liquid into the chamber, a liquid outlet at the lower end to allow the washing liquid out of the chamber, and lint retaining means for retaining lint in the chamber.

4,003,226
AIR BLAST DUST REMOVING MACHINE

Eric Holdsworth, Bramley, Leeds, England, assignor to USM Corporation, Beverly, Mass.

Filed Apr. 7, 1976, Ser. No. 674,300
Claims priority, application United Kingdom, Apr. 8, 1975, 14254/75
Int. Cl.² C14B 1/00
U.S. Cl. 69—1 9 Claims



1. A machine for removing dust from sheet material, said machine comprising:

a first conveyor having a belt for supporting the sheet material in generally flat condition and for moving the sheet material through said machine;

said belt being permeable to air;

a nozzle device for projecting at least one jet of air against an exposed surface of the sheet material supported by said conveyor belt as the sheet material is carried by said belt through said machine during operation thereof;

said jets being inclined at an obtuse angle to the oncoming exposed surface of the sheet material; and

a suction hold-down means disposed opposite said nozzle device with said conveyor belt disposed between said nozzle device and said hold-down means;

said hold-down means applying suction through said permeable conveyor belt to hold the sheet material in contact with the conveyor belt.

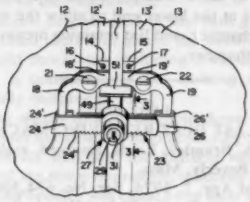
4,003,227
PORTABLE AND DETACHABLE DOUBLE CASEMENT WINDOW OPPOSING TURN LATCH HANDLES LOCK SECURING DEVICE

Joseph Taggart Casey, 308 El Portal, Hillsborough, Calif. 94010

Filed Feb. 2, 1976, Ser. No. 654,473
Int. Cl.² E05B 73/00
U.S. Cl. 70—14 7 Claims

1. A portable and detachable double casement window opposing turn latch handles lock securing device comprising two locking arms adapted to be respectively detachably connected to the respective window turn handles in their down turned latching positions and overlie one another in such positions and a lock mechanism adapted to receive the locking arms in their overlying and adjusted positions within the lock mechanism, said locking arms having ratchet teeth extending along their bottom edges, and said lock mechanism including pawls engagable with ratchet teeth of the arms and operable thereupon from opposite directions to engage respectively the

respective ratchet teeth to lock the locking arms against movement relative to each other, whereby the window handles will be locked in their opposing down turned latching positions against unauthorized turning.

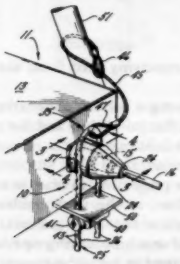


4,003,228

SECURITY APPARATUS FOR VEHICLE COMMUNICATIONS ACCESSORY

James Lee Lievens, 109 Third St., Rustic Acres, Colona, Ill. 61241, and Stanely Clarence De Decker, 24055 80th Ave. North, Port Byron, Ill. 61275

Filed Mar. 23, 1976, Ser. No. 669,512
Int. Cl.² E05B *73/00*
U.S. Cl. 70—58 **7 Claims**



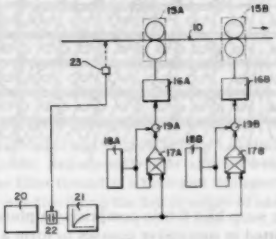
1. Security apparatus for a vehicle communications accessory having a case with top, bottom, side and rear walls and having a connector attached threadably to a complementary fitting projecting rearwardly from said rear wall, said connector being of substantially circular cross-section and having a forwardly facing annular shoulder which is spaced rearwardly from said rear wall when said connector is attached to said fitting, said security apparatus comprising at least two separable blocks each formed with an opening in one side thereof, said blocks being positionable on opposite sides of said connector with the openings in the blocks defining a cavity for receiving said connector, means at the forward end portion of said cavity and defining a rearwardly facing annular shoulder whose smallest diameter is smaller than the largest diameter of said forwardly facing annular shoulder, said rearwardly facing shoulder being disposed between said rear wall and said forwardly facing shoulder and being engageable with the latter to prevent rearward removal of said blocks from said connector, a locking device comprising a substantially U-shaped shackle having legs straddling said blocks and operable to prevent sidewise separation of said blocks, said locking device further comprising a key-operated lock spanning the legs of said shackle and selectively releasable from at least one of said legs to permit removal of said shackle from said blocks, and a flexible line having one end portion captivated by said shackle and having an opposite end portion adapted for attachment to a fixed object.

4,003,229

METHOD FOR COMPENSATING TAIL END

Toshio Harada; Shinichi Nakamata, both of Kisarazu; Shiro Araki; Koei Nakashima, both of Kitakyushu; Hironori Kawasaki, Kimitsu; Kazuo Watanabe, Kitakyushu, and Keiichi Miura, Kobe, all of Japan, assignors to Nippon Steel Corporation and Mitsubishi Electric Corporation, both of Tokyo, Japan

Continuation-in-part of Ser. No. 394-845, Sept. 6, 1973, abandoned. This application Mar. 26, 1975, Ser. No. 562,027
Claims priority, application Japan, Sept. 6, 1972, 47-88688
Int. Cl.² B21B *37/00*
U.S. Cl. 72—15 **4 Claims**



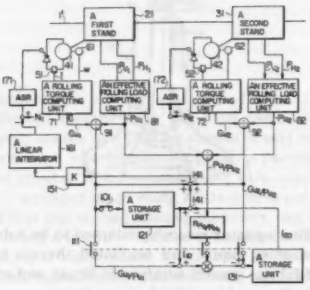
1. A method for compensating for the tail end crop portion when continuously rolling shaped steel sections, said sections including a web section and a flange section, said tail end crop portion lacking said flange section and said rolling being in a tension-free condition using at least two roll stands; comprising the steps of detecting said tail end crop portion, correcting the speed ratio between a preceding roll stand and a succeeding roll stand when the crop portion is introduced into said preceding roll stand and maintaining said correction only while the tail end crop portion passes said preceding roll stand to restore a tension-free condition in the tail end crop portion.

4,003,230

TENSION CONTROL SYSTEM FOR UNIVERSAL MILL

Yasuo Morooka, and Shinya Tanifuji, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 15, 1975, Ser. No. 604,951
Claims priority, application Japan, Aug. 16, 1974, 49-93363
Int. Cl.² B21B *37/08, 37/00*
U.S. Cl. 72—19 **14 Claims**



1. A tension control system for use in a continuous rolling mill system comprising a plurality of rolling mills each having horizontal and vertical rolls for simultaneously applying rolling loads on the same section of a billet to be rolled, electric motor means for driving said rolls, means for determining the horizontal and vertical rolling loads, means for determining the rolling torques of said electric motor means, and means for

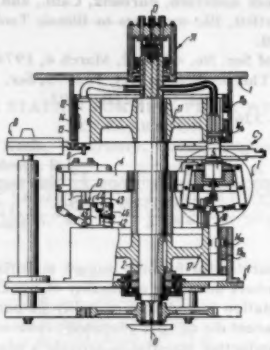
controlling the rotational speed of said electric motor means in dependence on the horizontal and vertical rolling loads and rolling torque of said electric motor means.

4,003,231

ROTARY MACHINE FOR MANUFACTURING HOLLOW ARTICLES

Viktor Konstantinovich Zhiklenkov, ulitsa 25 Sentyabrya, 54, kv. 26; Viktor Mikhailovich Ilin, ulitsa Rumyantseva, 15, kv. 14, both of Smolensk; Vitaly Matveevich Tanygin, ulitsa Teatralnaya, 3, kv. 66, Klimovsk Moskovskoi oblasti, and July Fedorovich Martynenkov, ulitsa Oktyabrskoi revoljutsii, 7, kv. 92, Smolensk, all of U.S.S.R.

Filed Aug. 18, 1975, Ser. No. 605,675
Int. Cl.² B21D *15/10*
U.S. Cl. 72—59 **6 Claims**



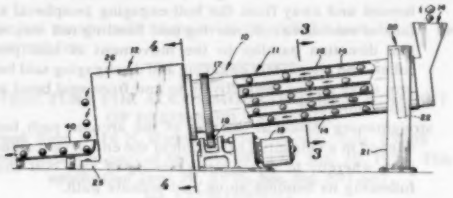
1. A rotary machine for manufacturing hollow articles, comprising; a framework; a device for loading blanks, mounted on said framework; a device for delivering shaped articles, also mounted on said framework; an article shaping device, mounted on said framework; said article shaping device, said blank loading device and said article delivering device being operatively connected with one another; said article shaping device incorporating a rotor assembly including: a shaft journalled in said framework; a support structure mounted on said shaft; a plurality of female die assemblies supported by said holder structure, each said female die assembly including a plurality of sleeves arranged coaxially and axially spaced from one another and adapted for being driven toward one another in an article shaping operation, each one of said sleeves being made up of two parts, the plane of the division of these parts being along the axis of said female die assembly, the said parts of each said sleeve being adapted to be radially reciprocated to clamp a blank in said female die assembly and to release a shaped article; grooves made in the external surfaces of the bottoms of said sleeves for shaping corrugations in a blank; an axial bore made axially in the bottom of each said sleeve and adapted to accommodate a blank therein; a drum mounted on said shaft of said rotor assembly to one side of said support structure of said female die assemblies; slides mounted in said drum coaxially with the respective ones of said female die assemblies, each said slide being adapted to feed a blank into the axial bores of the bottoms of said sleeves of said respective female die assembly and to effect filling of the internal space of a blank with a liquid medium under pressure, to initiate pre-shaping of the corrugations in the blank; a mandrel mounted in each said slide and adapted to receive a blank thereon; an auxiliary drum mounted on said shaft of said rotor assembly to the side of said support structure, remote from said first-mentioned drum; a plurality of male dies mounted in said auxiliary drum coaxially with the respective ones of said female die assemblies and extending parallel with the axis of said shaft; means for driving said male dies toward said female dies, mounted in said auxiliary drum; means for effecting radial reciprocation of the parts of said sleeves.

4,003,232

METHOD AND APPARATUS FOR CONTINUALLY FORMING SPHERICAL OBJECTS

Asparough (Oscar) Trendov, 4257 Wooddale Ave. South, Minneapolis, Minn. 55416

Filed Aug. 7, 1975, Ser. No. 602,580
Int. Cl.² B21H *1/14*
U.S. Cl. 72—68 **17 Claims**



1. A structure for forming substantially spherical objects including:

a. means defining a longitudinally extending axis of rotation;

b. at least one longitudinally extending, generally cylindrical material forming, tubular member having a material receiving end and a material delivery end mounted parallely to said axis of rotation and spaced parallely thereform;

c. means for rotating said forming member about said axis of rotation;

d. means for introducing a predetermined amount of formable material into said receiving end of said forming member; and,

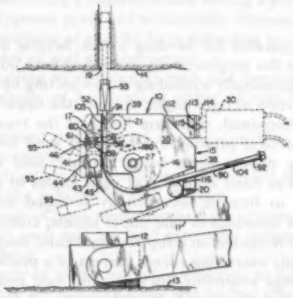
e. forming means arranged adjacent said delivery end of said forming member to receive an object therefrom.

4,003,233

BENDING AND STRAIGHTENING MECHANISM FOR MINE ROOF BOLTS

Ronald R. Stange, Denver, Colo., assignor to Tools for Bending, Inc., Denver, Colo.

Filed Apr. 7, 1975, Ser. No. 565,421
Int. Cl.² B21D *7/04*
U.S. Cl. 72—133 **17 Claims**



1. Apparatus adapted to successively bend and straighten an elongated bolt shank for insertion in a bolt hole comprising:

a drive roll rotatably mounted on a shaft and having an outer, bolt-engaging peripheral surface including drive means for rotating said drive roll;

a bend arm roller unit rotatably mounted beside said drive roll to follow the rotation of said drive roll, said bend arm roller unit including at least one pinch roller aligned with the bolt-engaging peripheral surface for movement into

position to engage a bolt shank disposed for extension tangentially along the bolt-engaging peripheral surface and including a bending roll means disposed radially outwardly of said bolt-engaging peripheral surface;

bend arm drive means engageable with said bend arm roller unit to effect rotation of said bend arm roller unit in an arcuate path following the bolt-engaging peripheral surface of the drive roll whereby to effect initial bending of the leading end of the bolt shank to conform to said arcuate path;

bend arm control means operative to effect radial movement of said bend arm roller unit accomplishing in unison the functions of moving said pinch roller alternately toward and away from the bolt-engaging peripheral surface of said drive roll, moving said bending roll means in like direction parallel to the movement of said pinch roller, and alternately engaging and disengaging said bend arm drive means respectively to and from said bend arm roller unit; and

straightening means at the end of the arcuate path being aligned in a tangential extension of the end of said arcuate path whereby to effect straightening of said bolt shank following its bending along said arcuate path.

4,003,234

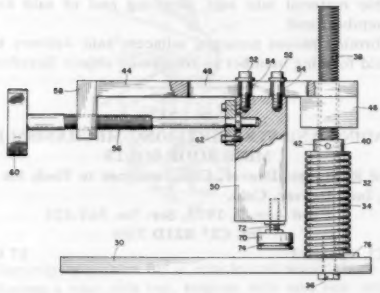
BENDING APPARATUS FOR PERFORATING STRIPS

Clyde W. Thompson, Tulsa, Okla., assignor to Carolea Wheeler, Tulsa, Okla.

Filed May 8, 1975, Ser. No. 575,611

Int. Cl.² B21D *7/024*

U.S. Cl. 72—141 **2 Claims**



1. Apparatus for bending a thin flexible and narrow strip having a flat longitudinally extending base portion and a central longitudinally extending rib projecting upwardly from the base portion at right angles thereto, the upper edge of said rib being sharpened, said strip being of the type adapted to be attached to a printing cylinder and used for perforating or shearing paper sheets being printed, said apparatus being adapted to bend said strip at right angles to the base portion thereof to form a substantially rounded shape for cutting rounded openings in said paper sheets; comprising a vertical cylinder mounted on a supporting means; said cylinder having a helically extending recess therein of a predetermined pitch, said recess extending inwardly into said cylinder a distance slightly less than one-half of the width of the base portion of said strip; a threaded shaft extending coaxially upwardly from said cylinder and having threads thereon of the same pitch as the recess of said cylinder; a horizontal arm rotatably mounted above said cylinder, said arm having a threaded portion threadedly engaging the threads of said threaded shaft; said arm having mounted thereon a slide member adapted to be moved towards and away from said cylinder, a rotatable wheel rotatably mounted in said slide member on the side thereof towards said cylinder, said wheel having an annular recess therein extending inwardly into the wheel a distance slightly less than one-half of the width of the base portion of said strip, the recess in said wheel being in alignment with the recess in said cylinder, means mounted on said arm for moving said slide member towards said cylinder so as to engage said wheel with a strip positioned between said wheel and said cylinder, the sides of the base portion of said strip being received in the opposed recesses in said wheel and said cylinder, whereby, when said arm is rotated, said strip will be bent around said cylinder in the helical recess thereof while the recess in said wheel remains in alignment with the recess in said cylinder.

4,003,235

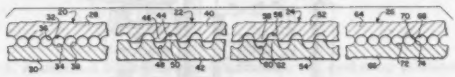
APPARATUS FOR MAKING A MULTIFINGER CONTACT

Stephen Verner Andersen, Burbank, Calif., and Edwin Grant Swick, Bartlett, Ill., assignors to Illinois Tool Works Inc., Chicago, Ill.

Division of Ser. No. 447,612, March 4, 1974, Pat. No. 3,936,624. This application Oct. 1, 1975, Ser. No. 618,597

Int. Cl.² B21D *31/02*

U.S. Cl. 72—326 **6 Claims**



1. An apparatus for forming unitary multifinger electrical contact members including a plurality of punch and die stations each station including a plurality of parallel, narrow, elongate adjacent die cavities adapated to successively deform a strip of conductive material to provide a plurality of independently flexing fingers emanating from an integral base portion, at least two stations including upper and lower tool portions adapted to cooperatively deform the strip of material positioned therebetween, the working face of each tool portion including narrow, elongate, parallel punch members positioned between adjacent die cavities, said die cavities being of continuously decreasing width from the working face to the bottom portion of the cavity wherein elongate fingers may be narrowed by compressing therein, the upper and lower tool faces being arranged so that the punch members of one face are aligned with the die cavities in the opposing face, said at least two stations having their working faces arranged so that the punch and die positions on the working faces of the second of the two stations are transposed from the punch and die positions in the first of the two stations so that elongate portions of the strip may be first deformed from the strip in one direction transverse to the plane of the strip in the first of the two stations and then deformed in the opposite direction transverse to the plane of the strip in the second of the two stations.

4,003,236

PROCESS OF HOT CONTINUOUS ROLLING

André Quehen, Pontoise, France, assignor to SECIM, Courbevoie, France

Filed Feb. 23, 1976, Ser. No. 660,318

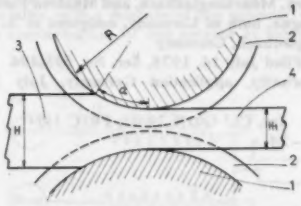
Claims priority, application France, Mar. 19, 1975, 75.08607

Int. Cl.² B21B *1/00*

U.S. Cl. 72—366 **3 Claims**

1. In a process of hot continuous rolling, by a train of two cylinder stands, of an aluminium alloy blank formed by a continuous casting grooved wheel, and at the normal temperature for hot rolling of the alloy, the improvement wherein at least at the first stand the thickness H of the blank is reduced

by passage between the cylinders of the first stand by a value ΔH satisfying the relation $h/a \leqslant C$, where $h = H - \Delta H/2$ and



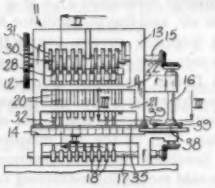
$a = \leqslant R\Delta H$, R being the radius of the rolling cylinders and C being a constant depending on the nature of the alloy.

4,003,237

MULTIPLE STATION FORMING PRESS WITH BLANK ACCELERATOR

George F. O'Keefe, Waterbury, Conn., assignor to Textron, Inc., Providence, R.I.

Filed Oct. 23, 1975, Ser. No. 625,047
Int. Cl.² B21D *43/05*
U.S. Cl. 72—405 9 Claims



1. A machine tool for forming metal articles from blanks cut from a strip of metal fed into the machine, said machine comprising in combination, a frame, a tool set mounted in said frame and including an array of plungers having punches mounted thereon and mating dies adapted to form work pieces fed to said dies, blank cutting means adjacent one end of said array of plungers and dies, transfer means mounted in said frame for sequentially advancing through said array of plungers and dies metal blanks cut by said cutting means, auxiliary blank carrying means supported on said transfer means and movable longitudinally thereof and actuating means adapted to move said blank carrying means relatively to said transfer means.

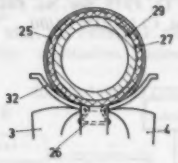
4,003,238

MECHANISM FOR INSTALLING HOSE BAND CLAMPS

Hans Oetiker, Oberdorfstrasse 21, 8810 Horgen, Switzerland

Filed July 8, 1975, Ser. No. 594,001
Claims priority, application Switzerland, July 8, 1974, 9365/74
Int. Cl.² B21D *9/08*
U.S. Cl. 72—410 25 Claims

1. A pincer-type mechanism for installing on a tubular member a hose band clamp provided with axial end faces and including at least one ear, which comprises two pincer jaw means movable relative to one another for pressing the roots of the ear against one another, characterized in that the mechanism also includes a spacing means provided with an aperture means for the ear, said spacing means being operable to shield



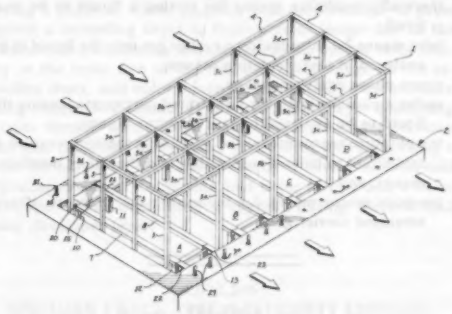
the jaw means with respect to the tubular member to be clamped fast.

4,003,239

STRUCTURE FOR ACCOMMODATING REALIGNMENT OF DEFORMED VEHICLES

Frank Step, 4410 N. Highway Drive, Tucson, Ariz. 85705

Continuation-in-part of Ser. No. 493,171, July 30, 1974. This application June 30, 1975, Ser. No. 591,607
Int. Cl.² B21D *1/14*
U.S. Cl. 72—457 2 Claims



1. An assembly for containing a plurality of vehicles and anchoring vehicle frame and chassis straightening tools, said assembly comprising:

a. a parallel set of a plurality of steel-reinforced cages, platforms and piers disposed within a building;

b. said cages including a superstructure having a plurality of vertically disposed posts and horizontally disposed beams defining a multiple of parallel bays extending to common opposed sides of said superstructure;

c. each bay having an opening at each end thereof for ingress and egress of a vehicle at either of said opposed sides;

d. each juxtaposed pair of bays sharing common vertical posts and horizontal beams;

e. said superstructure being effective to envelop the sides and tops of the vehicles located therein;

f. a parallel pair of said platforms being horizontally disposed within each said bay and extending between each end of the bays;

g. each said pair of platforms being effective to support a vehicle within the respective bay and further effective to allow passage completely through each bay;

h. a pillar located at the ends of each bay to support each platform;

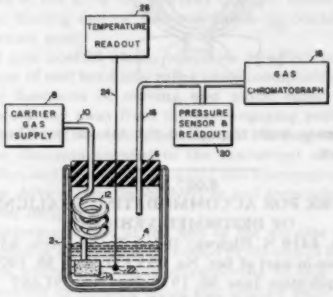
i. a foundation disposed beneath the superstructure for receiving the lower ends of each of said posts and said pillars;

j. a plurality of removable piers wherein each pier extends between the extremity of each platform and said foundation; and k. vehicle frame and chassis straightening tools anchored on said superstructure.

4,003,240
CALIBRATION DEVICE FOR VAPORIZED LIQUIDS

Damien E. Durbin, Missouri City, Tex., assignor to Honeywell Inc., Minneapolis, Minn.

Filed June 13, 1975, Ser. No. 586,542
Int. Cl.² G01N 31/00
U.S. Cl. 73—1 G 10 Claims

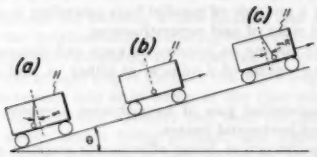


1. A vapor phase analyzer system comprising
thermally insulating means for storing a liquid to be analyzed,
inlet means for introducing a carrier gas into the liquid to be analyzed in said insulating means,
vapor phase analyzer means,
outlet means for applying a saturated carrier gas leaving the liquid to be analyzed to said analyzer means,
temperature sensor means for measuring the temperature of said liquid to be analyzed within said thermally insulating means, and
pressure sensor means for measuring the pressure of said saturated carrier gas.

4,003,241
ACCELEROMETER METHOD OF INDICATING ROLLING RESISTANCE OF A VEHICLE

Paul Randolph Thomas, Erie, Pa., assignor to General Electric Company, Erie, Pa.

Filed July 19, 1974, Ser. No. 490,129
Int. Cl.² G01N 3/56
U.S. Cl. 73—9 2 Claims

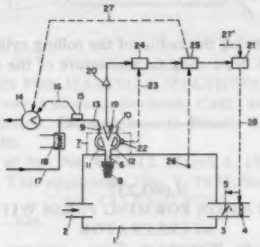


1. A method of measuring rolling resistance of a vehicle comprising:
a. adjustably mounting an accelerometer on a vehicle with its longitudinal axis of sensitivity aligned parallel with the direction of vehicle travel;
b. connecting a meter to said accelerometer to be responsive to the signal output therefrom;
c. calibrating said meter while the vehicle is stationary by inclining said accelerometer axis of sensitivity at a preselected small angle from the horizontal and adjusting the meter to read a multiple of the sine value of said angle; and
d. allowing said vehicle to coast and reading the vehicle coefficient of rolling resistance directly from said meter while the vehicle is accelerating or decelerating.

4,003,242
DEVICE FOR DETERMINING THE MIXING RATIO OF BINARY GASES

Heinz Houben, Monchengladbach, and Manfred Pabst, Weiden near Cologne, both of Germany, assignors to A. Monforts, Monchengladbach, Germany

Filed July 14, 1975, Ser. No. 595,494
Claims priority, application Germany, July 13, 1974, 2433764
Int. Cl.² G01N 29/02; F01C 1/04
U.S. Cl. 73—24 9 Claims



1. Device for determining the mixing ratio of binary gases in a mixture thereof by measuring the velocity of sound in the gas mixture, that velocity being determined by the oscillating frequency of a fluidic oscillator comprising a fluidic oscillator tuned to a fundamental frequency (f_o) at a predetermined temperature (T_o) in air, said fluidic oscillator having inlet and outlet means and feedback means connecting said outlet means to said inlet means, means for detecting the oscillating frequency of said fluidic oscillator, which determines the velocity of sound in the gas mixture, and transmitting a signal corresponding thereto, measuring means for measuring absolute gas temperature (T_g) of the gas mixture at a location other than in said feedback means, correction means operatively connected to said means for measuring said absolute gas temperature (T_g) for correcting, by a correction factor proportional to the square root of said absolute gas temperature (T_g), the value of the velocity of sound in the gas mixture determined by the oscillating frequency of said fluidic oscillator and represented by said transmitted signal, measuring means for measuring absolute temperature (T_r) of the gas mixture in said feedback means, correction means operatively connected to said means for measuring said feedback absolute temperature (T_r) for correcting, by a correction factor proportional to the difference between said feedback absolute temperature (T_r) and said predetermined temperature (T_o), the value of the velocity of sound in the gas mixture determined by the oscillating frequency of said fluidic oscillator and represented by said transmitted signal, and pump means for pumping the gas mixture through said fluidic oscillator, said pump means being adjusted to a range of pressures wherein oscillating frequencies produced in said fluidic oscillator and serving to determine the respective velocity of sound in the gas mixture being pumped therethrough are independent of variations in the gas pressure.

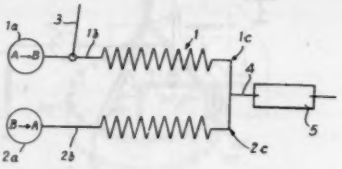
4,003,243
METHOD OF ANALYSIS BY LIQUID-PHASE CHROMATOGRAPHY

Gilbert Blu, and Flavien Lazarre, both of Pau, France, assignors to Societe Nationale des Petroles d'Aquitaine, Courbevoie, France

Filed July 15, 1975, Ser. No. 596,073
Claims priority, application France, July 18, 1974, 74.25036
Int. Cl.² G01N 31/08
U.S. Cl. 73—61.1 C 12 Claims

1. A method of analysis by liquid-phase chromatography

with a pre-selected elution-gradient programme, which comprises the steps of supplying each of two chromatography columns having at least approximately similar porous volumes and permeability, with a mixture of two solvents, while maintaining the concentration of one solvent at the inlet to one



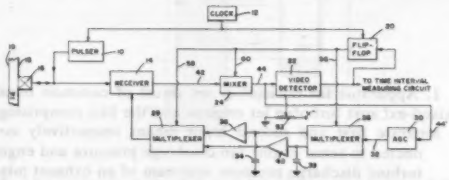
column equal at any point in time to the concentration of the other solvent at the inlet to the other column, injecting the product to be analyzed into the inlet of one of the two columns, bringing the fluids leaving both columns together to form a mixture, and analyzing said mixture in a concentration detector.

4,003,244

ULTRASONIC PULSE-ECHO THICKNESS MEASURING APPARATUS

Patrick M. O'Brien, Stratford; Richard J. Pittaro, Stamford, and Philip A. Walker, Trumbull, all of Conn., assignors to Krautkramer-Branson, Incorporated, Stratford, Conn.

Filed Sept. 30, 1975, Ser. No. 618,073
Int. Cl.² G01N *29/00*
U.S. Cl. 73—67.8 R **6 Claims**



1. An electrical circuit for an ultrasonic pulse-echo measuring apparatus comprising:

means for transmitting an ultrasonic search signal into a workpiece and receiving a first and a second echo responsive signal in response to the transmission of such search signal, said second signal as received being of lower amplitude than said first signal and being phase inverted relative to said first signal;

receiving means including signal amplifying means coupled for receiving said echo responsive signals and providing said signals after amplification to a time interval measuring circuit, and

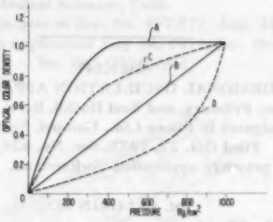
control means include phase inversion means coupled between said receiving means and said time interval measuring circuit for causing, in response to said amplified first echo responsive signal attaining a predetermined amplitude, said receiving means to be conditioned for increased amplification to cause said second echo responsive signal to attain said predetermined amplitude, and causing furthermore said phase inversion means to be conditioned for effecting said second echo responsive signal to be phase inverted with respect to said first echo responsive signal so as to be of the same phase as said first echo responsive signal when provided to said measuring circuit.

4,003,245

METHOD FOR PRESSURE MEASUREMENT

Yasuhiro Ogata, Fugimiya, and Kenji Ariyasu, Tokyo, both of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Mar. 26, 1975, Ser. No. 562,325
Claims priority, application Japan, Mar. 26, 1974, 49-33789
Int. Cl.² G01L *1/00*
U.S. Cl. 73—88 R **9 Claims**



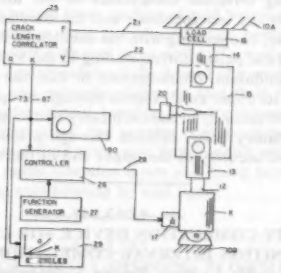
1. A method for measuring pressures which comprises allowing a material whose pressure is to be measured to press against a recording sheet to form a color image due to the pressure, and evaluating the changes in the optical color density or the color hue of the resulting color image on the recording sheet, said color image formation due to the pressure being effected by contacting a microcapsule layer containing a color former with a color developer layer under pressure and, said recording sheet being a recording unit comprising a color former sheet comprising a support having thereon said microcapsule layer containing said color former and a color developer sheet comprising a support having thereon said color developer layer.

4,003,246

SPECIMEN CRACK STRESS INTENSITY CONTROL LOOP FOR TEST DEVICE

Patrick J. Cain, Eden Prairie, Minn., assignor to MTS Systems Corporation, Minneapolis, Minn.

Filed Aug. 8, 1975, Ser. No. 603,134
Int. Cl.² G01N *3/32*
U.S. Cl. 73—90 **7 Claims**



1. A test apparatus for testing tension specimens under cyclic loading, wherein such specimens are caused to crack and crack growth across a width of a specimen is used for a test analysis, the improvement wherein an actuator for loading a specimen to be tested is provided; servo control means for controlling said actuator; means providing a feedback signal substantially proportional to the stress intensity factor at an end of a crack growing in a specimen being tested including transducer means to measure load on a specimen and displacement of a specimen being loaded, means connected to

said transducer means to provide a signal proportional to the length of a crack in a specimen being loaded, means to provide a signal which is a function of the compliance of the specimen, multiplying circuit means to provide an output signal Y which is substantially proportional to a polynomial function of the compliance factor, and further circuit means to provide an output substantially proportional to the quantity $kF\sqrt{a/W}\,Y$, where F is a signal proportional to the load applied to the specimen, a is a signal which is a known function of crack length, w is a signal which is a known function of specimen width and k is a constant; and means to couple said output of said further circuit means to said servo control means.

4,003,247

TORSIONAL OSCILLATION APPARATUS

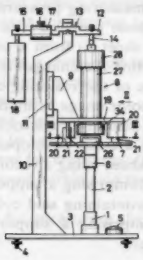
Kurt Moser, Fribourg, and Beat Hochli, Bern, both of Switzerland, assignors to Lonza Ltd., Gampel, Switzerland

Filed Oct. 22, 1975, Ser. No. 624,894

Claims priority, application Switzerland, Oct. 31, 1974, 14575/74

Int. Cl.² G01N 3/32

U.S. Cl. 73—99 **8 Claims**



1. A torsional oscillation apparatus, for example for testing plastics, comprising a lower clamp, arranged in torsionally-fast or non-rotating manner, for one end of a test specimen, an upper clamp for the other end of the test specimen, which upper clamp is connected securely to the underside of an oscillatory body which is suspended from a wire or thread which is twistable in a substantially resistance-free manner, a tautening device which exerts, on one of the clamps a force which keeps the test specimen taut, a stimulating device for stimulating torsional oscillations of the torsions pendulum formed by the test specimen and the oscillatory body, and a transducer, cooperating with the oscillatory body, for producing electrical pulses corresponding to the torsional oscillation of the pendulum, characterised in that the wire or thread, adjacent its upper end, extends through an upper eye which is connected securely to the oscillatory body and, directly above the oscillatory body, extends through a lower eye which is connected securely to the upper end of the wire or thread.

4,003,248

FAULTY COMBUSTION DEVICE FOR CONTROLLED IGNITION INTERNAL COMBUSTION ENGINE

Claude Leichle, Le Pecq, France, assignor to Regie Nationale des Usines Renault, Boulogne-Billancourt and Automobiles Peugeot, Paris, both of France

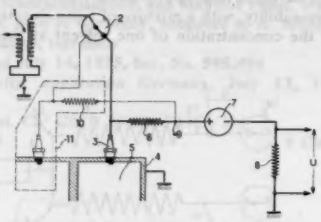
Filed Feb. 19, 1975, Ser. No. 551,453

Claims priority, application France, Feb. 20, 1974, 74.05778

Int. Cl.² G01M 15/00

U.S. Cl. 73—116 **8 Claims**

1. An apparatus for detecting faulty combustion in an internal combustion engine having spark plugs, comprising sensing means for determining whether the gas in the interelectrode space of a spark plug is ionized following the occurrence of each spark of that plug, and means responsive to said sensing means for emitting a malfunction signal when a predetermined



minimum number of consecutive sparks occur without said ionization occurring.

4,003,249

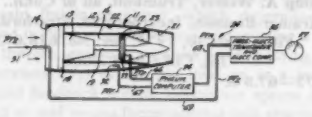
THRUST CORRELATED ENGINE PRESSURE RATIO INDICATOR AND METHOD FOR TURBOFAN ENGINES WITH MIXER-TYPE NOZZLES

Jerome R. Laskody, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Dec. 29, 1975, Ser. No. 644,895

Int. Cl.² G01M 15/00

U.S. Cl. 73—117.4 **6 Claims**



1. Apparatus for measuring net thrust of common nozzle mixed-exhaust turbofan jet engines and the like comprising:

separate first and second input means respectively connected to sense engine fan discharge pressure and engine turbine discharge pressure upstream of an exhaust mixer and output means combining sensed turbine discharge pressure with sensed fan discharge pressure to provide an output response representing a predetermined weighted average of said fan and turbine discharge pressures, and engine pressure ratio computing means having a first input connected to said output means to receive said output response and a second input connected to sense engine inlet pressure for computing the ratio between said output response and said engine inlet pressure and for providing an output signal representative of said ratio.

4,003,250

GEOTHERMAL HEAT FLUX TRANSDUCERS

Heinz F. Poppendiek, La Jolla, and Paul T. Meckel, Lakeside, both of Calif., assignors to Thermonetics Corporation, San Diego, Calif.

Continuation of Ser. No. 532,925, Dec. 16, 1974, abandoned. This application Sept. 8, 1975, Ser. No. 611,532

Int. Cl.² G01K 17/00

U.S. Cl. 73—190 H **20 Claims**

1. In a system in which it is desired to ascertain the flow of heat from a subterranean geothermal heat source wherein the improvement comprises a generally planar geothermal heat transducer structure encompassing a large area through which heat flux from said source flows and a multiplicity of thermal

hot junctions and associated cold junctions uniformly disposed in said structure throughout substantially all of said area, said hot and cold junctions being on a mounting structure which has a vertical dimension in the direction of heat flow at least equal to the horizonal width of the structure and

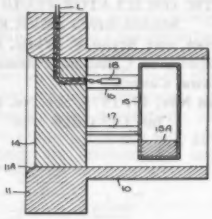
companion hot and cold junctions being spaced a distance equal to said vertical dimension, and means surrounding said mounting structure for preventing heat flux fringing to thereby assure parallel heat flux flow lines through said mounting structure, said mounting structure and said preventing means having substantially the same resistance to heat flow.

4,003,251

ACCELERATION-PROOF VORTEX-TYPE FLOWMETER

Peter J. Herzl, Morrisville, Pa., assignor to Fischer & Porter Co., Warminster, Pa.

Filed Mar. 19, 1976, Ser. No. 668,458
Int. Cl.² G01F *1/32*
U.S. Cl. 73—194 VS **7 Claims**



1. An acceleration-proof vortex-type flowmeter comprising:

A. a flow tube through which the fluid to be metered is conducted;

B. a vortex-shedding obstacle assembly disposed in said tube, said assembly having a first section fixedly supported across said tube and a second section deflectably suspended from the first section by upper and lower beams secured to the upper and lower end portions of the second section, said upper beam being bendable in an X-plane defined by movement of the deflectable section from side-to-side with respect to its neutral position and being unbendable in a Y-plane defined by movement of the deflectable section up-and-down with respect to its neutral position, said lower beam being unbendable in the X and Y planes, both beams being twistable, the mass of said deflectable section being balanced about said lower beam which acts as a torsion rod fulcrum, whereby vortex-shedding results in fluidic forces which are applied alternately to one side and the other of said deflectable section and produces a torque about the lower beam causing the deflectable section to swing on the lower beam at a frequency depending on the periodicity of said fluidic forces; and

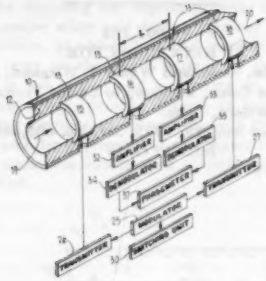
C. means to sense the swing of said deflectable section to provide an output signal reflecting flow rate, said deflectable section being insensitive to acceleration forces applied in the Y-plane, in that both beams are unbendable in this plane, said deflectable section being insensitive to acceleration forces applied in the X-plane in that while the upper beam is bendable in this plane, the lower beam above which the deflectable section is mass-balanced is not bendable in the X-plane and acceleration in the X-plane imposes no net force on the upper beam.

4,003,252

ACOUSTICAL WAVE FLOWMETER

Edward James Dewath, San Francisco, Calif., assignor to The Institutes of Medical Sciences, Calif.

Continuation-in-part of Ser. No. 497,971, Aug. 16, 1974, abandoned. This application July 24, 1975, Ser. No. 599,245
Int. Cl.² G01F *1/66*
U.S. Cl. 73—194 A **20 Claims**



1. A fluid flowmeter for measuring the velocity of a moving fluid, said flowmeter comprising:

an enclosed housing having an outer surface, an inner surface, a fluid inlet and a fluid outlet;

a generally cylindrical liner received within said housing and having an inner wall surface provided with first and second recesses spaced along the longitudinal axis of said liner by a predetermined distance and extending in a direction substantially normal to said axis, said liner being fabricated from a material providing acoustical damping and extending between said fluid inlet and said fluid outlet; and

first and second acousto-electric transducers operable in a radial vibration mode and carried by said liner, said transducers each having an outer wall surface received within a different one of said first and second recesses at a position interior to said inner surface of said housing, and an inner wall surface, said transducers each being dimensioned to provide with said inner wall surface of said liner a fluid flow conduit substantially devoid of protuberances and cavities and extending between said fluid inlet and said fluid outlet of said housing; said transducers being capable of generating and sensing compressional waves traveling in said fluid along said flow conduit when operated in said radial vibration mode and being acoustically isolated from said housing by said liner.

4,003,253

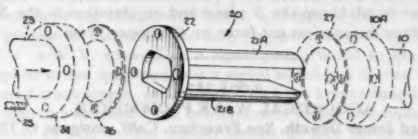
MULTI-RANGE VORTEX-SHEDDING FLOWMETER

John S. Yard, Doylestown; Peter J. Herzl, Morrisville, and Daniel Evans, Feasterville, all of Pa., assignors to Fischer & Porter Co., Warminster, Pa.

Filed Sept. 8, 1975, Ser. No. 611,170
Int. Cl.² G01F *1/32*
U.S. Cl. 73—194 VS **6 Claims**

1. A replaceable adapter for a vortex-shedding flowmeter provided with a flow tube forming a cylindrical passage through which the fluid to be metered is conducted, said tube having a mounting flange at the inlet thereof, and an obstacle assembly mounted within the tube to create vortices whose

frequency is a function of flow rate, said obstacle assembly including a block mounted cross the tube at right angles to the direction of flow, said adapter comprising a pair of rods disposed longitudinally in said flow tube on opposite sides of said



block to restrict the effective area of said passage, whereby said meter is responsive to flow rates which lie below the normal operating range of the meter, said rods being cantilevered from a support flange lying against said mounting flange.

4,003,254

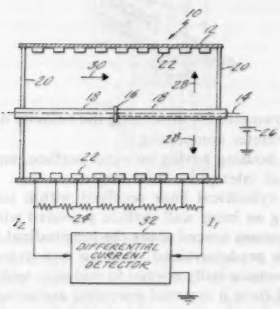
ION COLLECTOR

Robert H. Bullis, Avon, and Walter J. Wiegand, Jr., Glastonbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Aug. 18, 1975, Ser. No. 605,689

Int. Cl.² G01F 1/56

U.S. Cl. 73—194 F **6 Claims**



1. In an apparatus for sensing the flow of fluids passing along a flow axis through the apparatus which includes:

means proximate to the fluid flow for producing ions in the fluid;

means proximate to the fluid flow for collecting ions, the collection means being separated from the ion production means and extending in the direction of fluid flow; and

means responsive to the position of impingement of the ions on the collection means to measure the displacement of the ions along the flow axis due to the flow of the fluid along the axis during the ion migration across the flow from the production means to the collection means;

an improved ion collection means comprising a plurlity of discrete ion collectors arranged adjacent to each other along the flow axis, the collectors being spaced apart physically and connected in series electrically with an electric resistance in the connection between adjacent collectors.

4,003,255

MEASUREMENT AND CONTROL OF FLUID FLOW

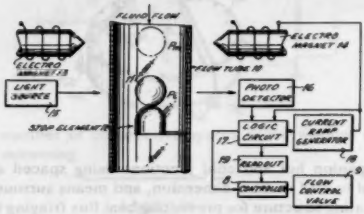
Jordan Spencer, Tenafly, N.J., assignor to Robert I. Pearlman, Elizabeth, N.J., a part interest

Continuation-in-part of Ser. No. 467,264, May 7, 1974, abandoned. This application Sept. 29, 1975, Ser. No. 617,600

Int. Cl.² G01F 1/28

U.S. Cl. 73—194 E **17 Claims**

1. Apparatus for measuring flow rates of fluids comprising a conduit, a float element having a magnetic responsive material associated therewith positioned in said conduit, a stop element positioned in said conduit which limits the motion of said float element in the downstream direction, electromagnetic means positioned in an upstream portion about said conduit before said stop element, means for gradually increasing the current to said electromagnetic mean to thus increase the magnetic force of said electromagnetic means so as to move said float



element away from said stop element and against the direction of fluid flow, said means for gradually increasing current to said electromagnetic means increasing current in a gradual stepwise manner to accurately measure the magnetic force required for the float to leave the stop element, means for detecting the initial departure of the float element away from the stop, and means for relating fluid flow to the degree of current required to move said float element away from said stop element.

4,003,256

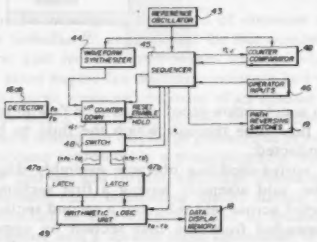
ACOUSTIC OSCILLATOR FLUID VELOCITY MEASURING DEVICE

A. Mark Donelan, and Bryan F. White, both of Burlington, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Nov. 17, 1975, Ser. No. 632,802

Int. Cl.² G01F 1/66

U.S. Cl. 73—194 A **3 Claims**



1. A fluid velocity measuring device comprising:

a free running continuous wave acoustic oscillator having a first and second acoustic transducer defining an acoustic path within the fluid and switching means coupled to the first and second transducer to periodically reverse the direction of acoustic energy propagation between the transducers, said acoustic path being the frequency determining element of the oscillator;

means for detecting the output signals of the oscillator as it propagates energy in a first direction in said fluid and in a second direction opposite the said first direction;

up/down counter means having the down terminal coupled to the oscillator signal detecting means;

reference oscillator means coupled to the up terminal of the counter;

switch means for coupling the output of the counter to first and second latching circuit means;

sequencer means for controlling said switch means to store the count from the counter means in said first latch means when the acoustic energy is propagated in a first direction, and in said second latch means when the acoustic energy is propagated in a second direction; and

logic means coupled to the first and second latch means to compute the fluid velocity as a function of the difference of the counts stored in said first and second latch means.

4,003,257

ANALYSIS OF VOLATILE ORGANIC COMPOUNDS

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Albert Zlatkis, Houston, Tex.

Filed Mar. 12, 1974, Ser. No. 450,504

Int. Cl.² G01N *31/06, 31/08, 33/02, 33/16*

U.S. Cl. 73—23.1 **36 Claims**

1. In a method of analysis in a gas chromatographic system for volatile organic compounds in a sample, the step of

remotely and independently of the gas chromatographic system trapping the volatile organic compounds in the sample by adsorbing them on a porous polymer consisting essentially of 2,6-diphenyl-p-phenylene oxide, said polymer having properties of high affinity for organic volatiles being hydrophobic, having temperature stability up to about 400° C., having good desorptivity, and being relatively inert to the sample, whereby such trapped volatile organic compounds are retained; for later chromatographic analysis.

4,003,258

APPARATUS FOR DETECTING THE LEVEL OF A PARTICULATE MATERIAL

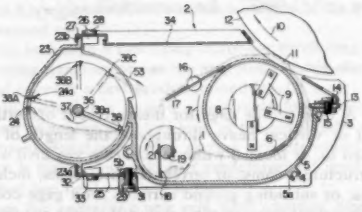
Minoru Suzuki, Yokohama, Japan, assignor to Ricoh Co., Ltd., Japan

Filed Aug. 8, 1975, Ser. No. 603,034

Claims priority, application Japan, Aug. 13, 1974, 49-92618

Int. Cl.² G01F *23/00;* **H01H** *36/00*

U.S. Cl. 73—290 R **12 Claims**



1. An apparatus for detecting the level of a particulate material contained in a vessel comprising:

a. a driven member rotatable about a horizontal axis in said vessel, a material engaging member affixed to said shaft and having a portion extending radially from the axis of rotation of said shaft and being rotatable with said driven member, said material engaging member having its center of gravity at a position based on the axis of rotation of said driven member;

b. a driving rotary member disposed in spaced aligned relationship to said driven member and being rotatable in a driving condition and being non-rotatable in a detection condition during which time said material engaging member falls by the influence of gravity onto the surface of the material;

c. a lost motion drive connection between said driven rotary member and said driving rotary member, permitting relative rotation therebetween through a predetermined angle and the driving of said driven member by said driving member; and

d. means for detecting the angular position of said driven rotary member when said driving member is in a detection condition, at which time said material engagement member rests on the upper surface of the particulate material in the vessel, and in arriving in this position, rotates said driven member through an angle relative to said driving member, in accordance with the level of the material and the movement of said material engagement member under the influence of gravity to the surface of the material.

4,003,259

METHOD AND A DEVICE FOR CAPACITIVE LEVEL MEASUREMENT

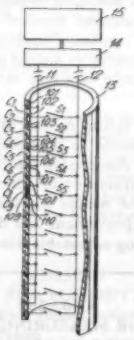
Bjorn Reinhardt Hope, Lommedalen, Norway, assignor to Navaltronic A/S, Oslo, Norway

Filed June 10, 1975, Ser. No. 585,609

Claims priority, application Norway, June 10, 1974, 2093/74

Int. Cl.² G01F *23/26*

U.S. Cl. 73—304 C **25 Claims**



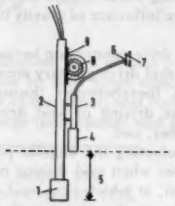
1. A method for capacitive measurement of the level of material, comprising providing at least a pair of vertically-oriented capacitive plates arranged in a position one above the other adjacent said material such that a substantial fringing electric field extends through a predetermined region between adjacent edges of said plates when a voltage is applied between one of said plates and the other of said plates; and sensing differences in the electrical capacity between said plates due to different levels of said material in said region.

4,003,260

APPARATUS FOR TESTING MOLTEN METAL

Philippe Felix Catoul, Horion-Hozemont, Belgium, assignor to Centre de Recherches Metallurgiques-Centrum voor Research in de Metallurgie, Brussels, Belgium

Filed Nov. 25, 1974, Ser. No. 526,687
Claims priority, application Belgium, Nov. 27, 1973, 807880
Int. Cl.² G01F *23/00*; G01N *1/10*
U.S. Cl. 73—423 R **5 Claims**



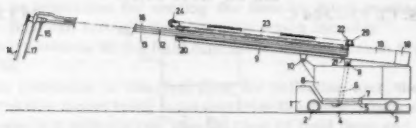
1. An apparatus for testing molten metal by lowering a measuring or sampling probe to a desired depth in the molten metal, the apparatus comprising: a probe; a probe carrier; means for lowering and raising the probe carrier; and a contact detector which emits a pneumatic signal when the detector comes into contact with the molten metal, the detector being fixed on the probe carrier at a distance above the probe and comprises a hollow body of material which burns on contact with molten metal, the pneumatic signal being produced by the pressure created in the hollow body by the gaseous products of combustion of the material.

4,003,261

APPARATUS FOR TESTING MOLTEN METAL

Jean Adolphe Nautet, Liege, and Philippe Felix Catoul, Horion-Hozemont, both of Belgium, assignors to Centre de Recherches Metallurgiques-Centrum Voor Research in de Metallurgie, Brussels, Belgium

Filed Mar. 3, 1976, Ser. No. 663,553
Claims priority, application Belgium, Mar. 7, 1975, 826455
Int. Cl.² G01N *1/12*
U.S. Cl. 73—423 R **7 Claims**



1. In apparatus for testing molten metal by lowering a measuring or sampling probe to a desired depth in the molten metal, the apparatus comprising a probe, an elongate probe-carrier, a support structure on which the probe-carrier is tiltably mounted, and means for lowering and raising the probe-carrier: the improvement that the probe-carrier is telescopic, its length being adjustable between given limits.

4,003,262

APPARATUS FOR MEASURING PRECISE MICRO QUANTITIES OF FLUID SAMPLES

Horace W. Gerarde, deceased, late of Tenafly, N.J., by The Midlantic National Bank Citizens, executor, Englewood, N.J., assignors to Becton, Dickinson and Company, East Rutherford, N.J.

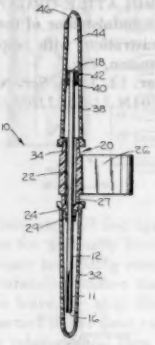
Filed Dec. 16, 1974, Ser. No. 532,820
Int. Cl.² G01N *1/10*
U.S. Cl. 73—425 **3 Claims**

1. An apparatus for measuring and diluting precise quantities of fluid samples comprising:

a precision, self-filling capillary tube having the capability of holding a volume greater than 50 microliters;

a holder having a longitudinally extending bore therethrough, said capillary being mounted in said bore and disposed so that said holder is positioned between the ends of the capillary, said bore providing an interference fit for holding the capillary tube in fixed position in said holder;

a shield removably mounted on the holder and telescopically positioned over one end portion of said capillary tube;



an adaptor mounted on said one end of said capillary tube and having surfaces thereon for making sealing contact with the inner surface of said shield so that the portion of said shield extending above said adaptor forms an overflow chamber;

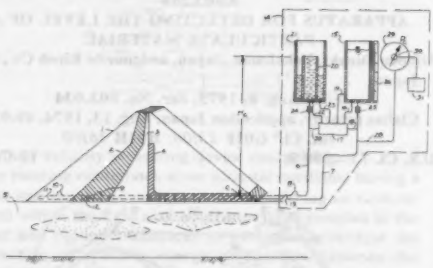
said shield having a vent formed in the closed end thereof so that the capillary tube is open to atmospheric pressure to permit said fluid samples to fill said tube by capillary action.

4,003,263

TUBE PROFILE GAGE

John E. O'Rourke, Contra Costa County, Moraga, Calif. 94556

Continuation-in-part of Ser. No. 471,446, May 20, 1974, abandoned. This application Jan. 14, 1976, Ser. No. 649,068
Int. Cl.² G01C *5/04*
U.S. Cl. 73—432 HA **5 Claims**



1. A tube profile gage for measurement of vertical settlement or vertical heave throughout the length of a conduit affixed to, or located within or beneath any civil works, such as structures, dams, or terrestrial formations; including land slides, or subsiding ground surfaces, said gage comprising a measurement traverse of a conduit along the required route of observation for vertical movement of the works, such conduit being of flexible, pressure tight construction, with the ends of the measurement traverse conduit brought to some convenient, accessible terminal location relative to the works, for

connection to readout cabinet, with means in the cabinet of flushing and completely filling the said measurement traverse with a light density fluid, with further means of then introducing a heavy density fluid from the cabinet into one end of the measurement traverse, with further means in the cabinet of regulating the rate and duration of advance of the heavy density fluid into the measurement traverse and the light density fluid out of the measurement traverse, with means of determining the distance of travel of the heavy density/light density fluid interface into the measurement traverse, with further means of continuously maintaining a surface level of heavy density fluid in the cabinet at a constant reference elevation irrespective of the amount of heavy density fluid supplied from the cabinet into the measurement traverse, with means of determining the hydrostatic pressure resulting from the vertical position of the heavy density/light density fluid interface with respect to the constant elevation of the said surface of the heavy density fluid in the cabinet, and thereby discovering the true vertical distance between the said fluid interface and the known elevation of the surface of the heavy density fluid in the cabinet, with further means of automatically recording and calibrating the hydrodynamic pressure variation produced by a continuously moving fluid interface, at a recording time rate proportional to the rate of travel of the fluid interface through the measurement traverse, thereby producing the digital data or actual scaled drawing of the existing elevation profile for the measurement traverse, which may be compared with earlier elevation profiles to discern the vertical movement which has occurred in the appurtenant works, to-date.

4,003,264

DEVICE FOR MEASURING AND REGISTERING OF SOUND

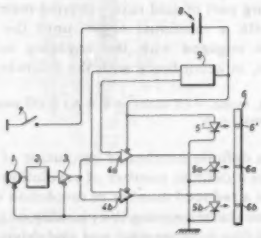
Bengt Erlandsson, Lund; Hakan Hakansson, Staffanstorp; Bengt Salén, Umea; Per Nilsson, Loddekopinge, and Alf Ivarsson, Bjarred, all of Sweden, assignors to Shine Patent AB, Sweden

Filed Oct. 21, 1975, Ser. No. 624,446

Claims priority, application Sweden, Oct. 24, 1974, 7413396

Int. Cl.² G01H *3/12*

U.S. Cl. 73—557 **6 Claims**



1. An audio dosimeter comprising:

a. means for sensing sound and producing an electrical signal having an amplitude which is related to the level of the sensed sound;

b. means including a first comparator for producing a first switching signal as long as the amplitude of said electrical signal exceeds a first predetermined level;

c. means including a second comparator for producing a second switching signal as long as the amplitude of said electrical signal exceeds a second predetermined level which is higher than said first predetermined level;

d. at least two light emitting diodes;

e. means for energizing one said light emitting diodes in response to the presence of said first switching signal so that it produces a light flux of essentially constant intensity regardless of by how much the amplitude of said electrical signal exceeds said first predetermined level;

f. means for energizing the other of said light emitting diodes in response to the presence of said second switching signal so that it produces a light flux of essentially constant intensity regardless of by how much the amplitude of said electrical signal exceeds said second predetermined level; and

g. a single piece of film arranged in light-proof relation to said light emitting diodes for individually and separately recording the light emitted by said light emitting diodes, said film recording light pulses of as short as 0.1 millisecond thereon.

4,003,265

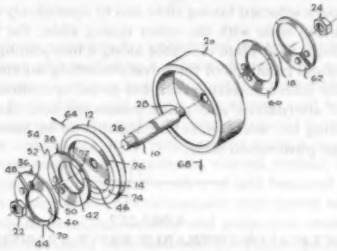
MASS BALANCING SYSTEM FOR ROTATABLE ASSEMBLIES

Robert Jerzy G. Craig, Malibu, and Clifton Temple Council, Woodland Hills, both of Calif., assignors to Litton Systems, Inc., Beverly Hills, Calif.

Filed July 9, 1975, Ser. No. 594,460

Int. Cl.² G01C *19/06*

U.S. Cl. 74—5 R **5 Claims**



1. A gyroscope, comprising

a rotor mounted for rotation about axis;

a pot-shaped hysteresis ring support forming part of said rotor;

a stop plate of the rotor accommodated in said hysteresis ring support, said stop plate having a recess defined by radially inwardly oriented surface locations surrounding and facing said axis;

at least two substantially identically shaped balance weights for assembly with said stop plate accommodated within said recess by virtue of frictional engagement of peripheral areas of the balance weights with said radially inwardly oriented surface locations;

each balance weight having an asymmetrical mass distribution with respect to said axis when assembled with said stop plate; and

spring means associated with each balance weight for resiliently urging at least some peripheral areas of each said balance weight outwardly, to thereby removably retain each of the balance weights assembled with said stop plate in any one of a great number of angular orientations rotationally displaced one from the other about said axis.

4,003,266

ACTUATOR FOR PUSHBUTTON TUNER

Shohei Yamagishi, Tokyo, Japan, assignor to Nihon Technical Kabushiki Kaisha, Japan

Filed June 11, 1975, Ser. No. 586,082

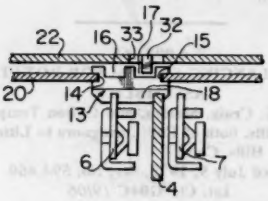
Claims priority, application Japan, Nov. 12, 1974, 49-129570

Int. Cl.² F16H *35/18*

U.S. Cl. 74—10.33 **11 Claims**

1. An actuator for a pushbutton tuner comprising, a pushbutton slide movable between an inoperative position and an operative position; a pair of parallel tuning slides parallel with said pushbutton slide on opposite sides thereof, an intercon-

necting member disposed extending transversely of said pushbutton slide for selectively, operatively connecting alternatively and alternately the pushbutton slide with either one of the pair of tuning slides for maintaining an operative connection therebetween so that the selected tuning slide can be moved between its inoperative position and its operative position as the pushbutton slide is moved axially; shift means for moving the interconnecting member transversely of the pushbutton slide between a pair of operational positions in order to



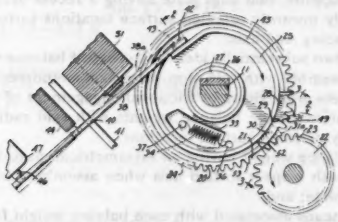
disconnect the operative connection between the pushbutton slide and a selected tuning slide and to operatively connect the pushbutton slide with the other tuning slide; the shift means including a shift plate movable along a line joining the pair of operational positions of the interconnecting member for actuating the interconnecting member to the operational positions thereof alternately; and guide means on said shift plate for permitting the interconnecting member to be moved together with the pushbutton slide.

4,003,267

CYCLICALLY OPERABLE DRIVE TRANSMISSION

Richard E. Busch, La Puente, Calif., assignor to Addmaster Corporation, San Gabriel, Calif.

Filed Feb. 12, 1976, Ser. No. 657,615
Int. Cl.² F16H *27/04, 29/00, 55/04*
U.S. Cl. 74—84 R **7 Claims**



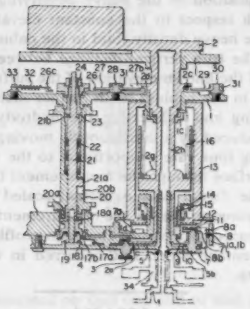
1. A cyclically operable drive transmission comprising
a drive gear,
a first rotatable driven gear,
said first driven gear having a first interrupted gear tooth section,
first maintaining means normally maintaining said first gear in an initial position wherein the interrupted portion of said gear tooth section is opposite said drive gear,
a second driven gear,
said second gear having a second interrupted gear tooth section,
second maintaining means for normally maintaining said second driven gear in an initial position wherein the interrupted portion of said second gear tooth section is opposite said drive gear,
means for urging said first gear relative to said second gear,
means for releasing said first maintaining means whereby to enable said first gear tooth section of said first gear to mesh with said drive gear, and
means operable by said first gear for driving said second gear to mesh said second gear tooth section of said second gear with said drive gear.

4,003,268

FILM WINDING DEVICE FOR PHOTOGRAPHIC CAMERAS

Terushige Shimizu, Kawasaki, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Continuation of Ser. No. 480,482, June 18, 1974, abandoned.
This application May 23, 1975, Ser. No. 580,522
Int. Cl.² F16H *27/02, 29/02;* **G03B** *1/24, 1/10*
U.S. Cl. 74—126 **11 Claims**



1. A film winding device for photographic cameras, which comprises:
a. a film winding shaft having a gear;
b. a rotary driving member driven by the film winding shaft, and having a gear and an engaging part thereon;
c. a fixed gear to transmit rotational force of said film winding shaft to the rotary driving member; and
d. a sprocket having an engaging member to be engaged with the engaging part of said driving member during winding operation to receive the rotational force of said rotary driving member, the improvement resides in that
the engaging part of said rotary driving member being provided with a rotational angle, until the engaging part becomes engaged with the engaging member of said sprocket, in accordance with the following equations:

$$A = A' \text{ L const.} = (\text{S const.} + \theta + A) \times \text{I/G const. D} = \text{S const.} + A'$$

where: L is a definite number of revolution of said film winding shaft; S is a definite number of revolution desired of said sprocket; θ is a reduced number of revolution of said sprocket due to the backlashes among the plurality of gears assembled between said film winding shaft and said driving member; A is a reduced number of revolution of said sprocket due to the distance between the engaging part of said driving member and the engaging part of said sprocket; I/G const. is a gear ratio of said rotary driving member to said film winding shaft; D is a number of revolution of said driving member; and A′ is a number of revolution of said rotary driving member, until the driving member becomes engaged with the engaging part of said sprocket.

4,003,269

POWER TRANSMISSION BELT

William M. Haines, Englewood, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Filed Feb. 17, 1976, Ser. No. 658,635
Int. Cl.² F16H *7/00;* **F16G** *5/00, 1/22, 5/10*
U.S. Cl. 74—229 **11 Claims**

1. A power transmission belt having a top, and bottom, and

oppositely facing side driving surfaces extending therebetween, said belt comprising:

a tensile member;

a first layer secured to the tensile member and defining the top of the belt;

a second layer secured to the tensile member and defining the bottom of the belt, said second layer comprising two rows of spaced teeth oriented longitudinally in relation to the belt, the teeth of the rows alternately longitudinally spaced from each other, and the teeth having oppositely oriented faces which substantially define the driving surfaces of the belt.

4,003,270

COUPLING MECHANISM WITH MEANS FOR DISENGAGEMENT AND FOR AUTOMATIC ENGAGEMENT OF THE SPOOL IN SPINNING REELS

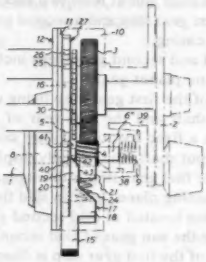
Börje Sigurd Moosberg, Morrum, Sweden, assignor to ABU Aktiebolag, Svangsta, Sweden

Filed Oct. 20, 1975, Ser. No. 623,991

Claims priority, application Sweden, Oct. 21, 1974, 7413210

Int. Cl.² F16H *57/00*; A01K *89/00*

U.S. Cl. 74—405 **22 Claims**



1. Coupling mechanism in a spinning reel for manual disengagement and automatic engagement of the reel, said mechanism including a coupling member connected to said spool and a unit of assembled parts consisting of a driving coupling member rotatable by means of a crank and a guide means for rotatable and axially shiftable mounting of said driving coupling member which normally enmeshes in driving engagement with the coupling member of said spool and is switchable by means of a manually actuable operating device from this driving engagement by shifting in a direction from said spool against the action of a return spring to a disengagement position in which it is retained by means of a latching device which is releasable by the rotation of said crank for triggering of an automatic re-engagement operation realized by means of said return spring, wherein said spool is, together with its coupling member rotatably journaled in said spinning reel independent of said unit comprising said driving coupling member and said guide means, and wherein said unit is, in the disengagement position of said driving coupling member, supported completely free from contact in relation to the spool and to elements connected to the spool, with said driving coupling member axially directed for shifting to the engagement position.

4,003,271

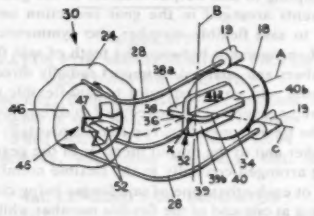
MIRROR ASSEMBLY

Gerard N. Stelma, Grand Rapids, Mich., assignor to Keeler Brass Company, Grand Rapids, Mich.

Filed Mar. 14, 1975, Ser. No. 558,309

Int. Cl.² F16C *1/12*

U.S. Cl. 74—501 M **23 Claims**



1. In a mirror assembly for vehicles of the type including a base, a mirror unit including a mirror element and a mirror support engaging said base for supporting said mirror element, and means for holding said mirror unit against said base; an improved joint means for pivotally connecting said mirror unit to said base comprising: a curved, concave surface on one of said base and mirror unit; a convex, curved surface mating with said concave surface on the other of said base and mirror unit; socket means in one of said concave and convex surfaces for receiving a projection means; and projection means extending from the other of said concave and convex surfaces for insertion in said socket means; said concave and convex surfaces together supporting and guiding pivotal movement of said mirror unit about a predetermined point and a pair of coplanar, perpendicular axes intersecting at said point; said socket and projections means including adjacent surface means for minimizing rotational movement of said mirror unit about a third, predetermined axis which passes through said point and is generally normal to the plane of said mirror element but allowing pivotal movement of said mirror unit about said point and said pair of coplanar, perpendicular, intersecting axes whereby blurring of images on said mirror element due to vibration is substantially eliminated.

4,003,272

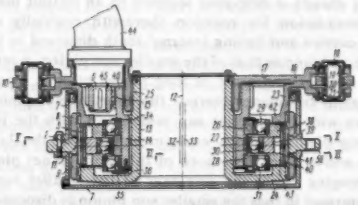
HARMONIC GEAR REDUCTION UNIT

Dmitry Pavlovich Volkov, Kolpachny pereulok, 6, kv. 104; Alexandr Filippovich Krainev, Bratskaya ulitsa 23, korpus 1, kv. 4; Alexandr Alexeevich Stupakov, Rossoshanskaya ulitsa 13, korpus 1, kv. 545, all of Moscow, and Stanislav Vasilievich Bondarenko, ulitsa Schelkovskaya, 12, kv. 80, Moskovskaya oblast, Mytischi, all of U.S.S.R.

Filed Jan. 31, 1975, Ser. No. 545,931

Int. Cl.² F16H *37/00, 1/28*

U.S. Cl. 74—640 **3 Claims**



1. A gear reduction unit comprising: input and output mem-

bers; a rigid member in the form of a gear wheel; a flexible member in the form of a thin-walled tube provided with a gear rim; a wave generator connected to said input member of the gear reduction unit; a first coupling connecting one end of said flexible member to said output member of the gear reduction unit; a second coupling arranged symmetrically with respect to said first coupling about the axis of engagement between the teeth of said flexible and rigid members of the gear reduction unit and serving to connect the other end of said flexible member of the gear reduction unit to the output member of the gear reduction unit; a positive connection adapted to connect said other end of the flexible member through said second coupling to said output member of the gear reduction unit; elements arranged in the gear reduction unit in close proximity to said flexible member also symmetrically about the axis of engagement between the teeth of said flexible and rigid members and adapted to impart radially directed deformations from said wave generator to said flexible member so as to ensure engagement of the teeth of said rigid member with those of the flexible member, two flanges pivotally connected to each other and to the output member of the gear reduction unit being arranged coaxially to the flexible member in close proximity ot each other, one of said fanges being connected to the coupling at one end of the flexible member while the other of the flanges is connected to the coupling at other end thereof thereby ensuring uniform distribution of the torque transmitted from the flexible member to the output member between both ends of the flexible member.

4,003,273

MULTI-RATIO TRANSMISSION SYSTEMS

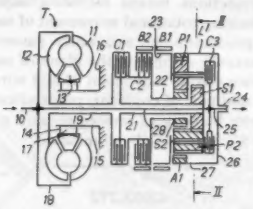
Albert Arthur Miller, Esher, England, assignor to Wilson-Miller & Co. Ltd., Hampton Court, England

Filed Mar. 27, 1975, Ser. No. 562,500

Claims priority, application United Kingdom, Mar. 30, 1974, 14223/74

Int. Cl.² F16H *57/10*

U.S. Cl. 74—767 **8 Claims**



1. A variable speed-ratio power transmission comprising a hydrokinetic torque transmitter whose input member is adapted to be driven by a primer-mover and a planetary gear set disposed coaxially in relation to the torque transmitter and on that side of the latter which is nearer the final output member of the transmission, the said gear set having larger sun pinion and a smaller sun pinion, a planet carrier mounted on bearings coaxially with the said sun pinions and with the torque transmitter and provided with selectively operable braking means, a ring-gear secured to an output member of the transmission for rotation therewith coaxially with the planet carrier and having internal teeth disposed in the same transverse plane as that of the smaller sun pinion, a set of short planet pinions and a set of long planet pinions mounted on bearings in the planet carrier, the short planet pinions each meshing with the smaller sun pinion and with the ring-gear, the long planet pinions each meshing with the larger sun pinion and with one or more of the short planet pinions but not engaging either the ring-gear or the smaller sun pinion, characterised in that the smaller sun pinion is disposed on that side of the larger sun pinion which is nearer to the torque transmitter and is provided with selectively operable braking means whereby it may be arrested to provide the reaction for an overdrive ratio and each sun pinion is provided with independent clutching means whereby either or both sun pinions may be drivably connected to the turbine or output member of the torque-transmitter, and in that the transmission includes further independent clutching means whereby a driving connection may be established between the input member of the torque transmitter and the planet carrier through the medium of a central drive shaft which passes freely through the torque transmitter and through the two sun pinions.

4,003,274

SUN AND PLANET GEAR TRANSMISSION MECHANISM PARTICULARLY FOR POWER WRENCHES

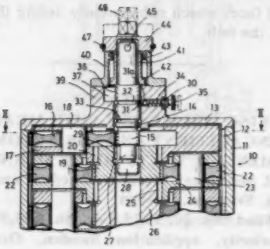
Karl-Richard Hirtsiefer, 5206 Neunkirchen-Kobach, Germany

Filed Apr. 24, 1974, Ser. No. 463,485

Claims priority, application Germany, Apr. 25, 1973, 2320757

Int. Cl.² F16H *57/10*

U.S. Cl. 74—768 **13 Claims**



1. A sun and planet gear transmission mechanism particularly for power wrenches comprising:

a. a power input shaft and at least two successive gear steps including a first gear step and a second gear step disposed within a gear casing,

b. each said first and second gear steps including a sun gear and at least one planet gear,

c. the sun gear of the first gear step being connected to the power input shaft and the sun gear of the second gear steps being in a fixed location within said gear casing,

d. said power input shaft being axially displaceable and said sun gear of the first gear step is disengagable with respect to the appertaining planet gear in said first gear step, and

e. coupling means located at said second gear step is effective to engage the sun gear of said second gear step when said sun gear of the first gear step is disengaged from said planet gear in the first gear step.

4,003,275

WRENCH

Rodney W. Smith, 83353 Spruce Lane, Florence, Oreg. 97439

Filed Feb. 25, 1976, Ser. No. 661,034

Int. Cl.² B25B *17/00*

U.S. Cl. 81—57.29 **1 Claim**

1. A wrench comprising an elongate tubular handle, a housing rigidly secured to one end of said handle, a shaft extending through said handle and having a knob thereon at the end thereof opposite the housing, a bevel gear rigidly secured to the end of said shaft opposite said knob with said bevel gear lying within said housing, a shaft mounted in said housing and extending transversely thereof with its axis perpendicular to the axis of the shaft in said housing, a worm gear journalled on said last named shaft and having a bevel gear secured thereto and in mesh with the bevel gear on said first named shaft, a drive member journalled at one end in said housing on an axis generally perpendicular to said handle and slightly offset from the axis of said handle, said drive member including a spur

gear meshing with said worm gear so as to rotate said drive member on rotation of said worm gear, said drive member including a post mounted centrally thereof to receive a drive socket, said spur gear spaced radially outwardly of said post

and encompassing said post, and means on said post for releasably retaining said socket thereon, said drive member having a central bore extending therethrough and through said post to permit a bolt shaft to extend therethrough when of excessive length.

4,003,276

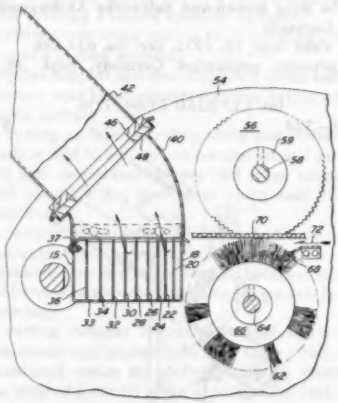
SLITTER AND DUST COLLECTOR THEREFOR

Robert L. Schmitt, Magnolia, N.J., assignor to Molins Machine Company, Inc., Camden, N.J.

Continuation of Ser. No. 510,208, Sept. 30, 1974, abandoned. This application Apr. 5, 1976, Ser. No. 674,017

Int. Cl.² B26D *7/06*

U.S. Cl. 83—100 **11 Claims**



1. A slitter for slitting a web comprising a frame, a shaft rotatably supported by the frame, a plurality of slitting blades connected to the shaft for rotation therewith and being selectively adjustable to various positions along said shaft, motor means for rotatably driving said shaft, a bristle-face anvil roll generally parallel to and directly below said shaft, the bristles of said anvil roll having an interference fit with each of said blades thereabove, a dust collector supported by said frame downstream from said shaft and being generally parallel to said shaft, said dust collector including a housing having top and bottom walls interconnected with a front wall and a rear wall, said front wall having an elongated dust opening below the elevation of and facing the interface between said blades and anvil roll, a plurality of partitions in said housing, said partitions having a straight portion generally parallel to the plane of said opening, said housing having a manifold chamber adjacent one end, the space between said partitions communicating said manifold chamber with said opening in a manner so that the space between adjacent partitions communicates said manifold chamber with only a portion of said opening, and means supporting said dust collector housing from said frame independent of the support of said anvil roll by said frame.

4,003,277

APPARATUS FOR MANIPULATING FILTER ROD SECTIONS OR THE LIKE

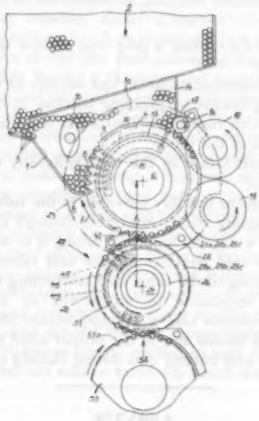
Erwin Oesterling, Hamburg, Germany, assignor to Hauni-Werke Korber & Co., KG, Hamburg, Germany

Filed Oct. 9, 1973, Ser. No. 404,604

Claims priority, application Germany, Oct. 13, 1972, 2250267

Int. Cl.² B26D *7/06;* **B65G** *47/26*

U.S. Cl. 83—102 **16 Claims**



1. In an apparatus for manipulating filter rod sections or analogous rod-shaped articles, a combination comprising a first conveyor having a plurality of first receiving means each arranged to transport sideways a group of *n* coaxial articles along a first substantially circular path having a portion extending along a transfer station, said conveyor having a first pitch circle; a second conveyor having *n* annuli of second receiving means each arranged to receive and to transport sideways a single article along a second substantially circular path having a portion extending along said transfer station, said second conveyor having a second pitch circle and the distance between the centers of said pitch circles exceeding the combined length of te radii of said first and second pitch circles, the second receiving means of said annuli being staggered with respect to each other, as considered in the circumferential direction of said second conveyor; means for moving said first conveyor in a first direction; means for moving all of said annuli at the same speed in a second direction counter to said first direction so that the angular positions of said second receiving means with respect to each other remain unchanged; guide means defining at said transfer station a channel extending between said portions of said first and second paths; means for directing groups of articles from successive first receiving means in said portion of said first path into said channel wherein the articles of a group move sideways in a direction from said portion of said first path toward said portion of said

second path; and means for transferring each article of a group in said channel into a second receiving means of a different annulus at timely spaced intervals so that each article of a group in said channel is located in a different portion of said channel when engaged by said transferring means.

4,003,278

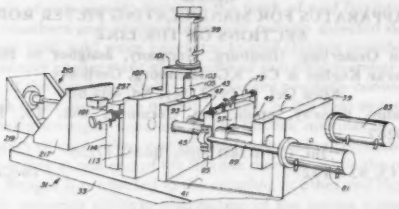
TUBE CUTTING APPARATUS

John Tipton Shields, Jackson, Miss., assignor to Jackes-Evans Manufacturing Company, St. Louis, Mo.

Filed Mar. 14, 1975, Ser. No. 558,484

Int. Cl.² B23D 21/14

U.S. Cl. 83—186 **34 Claims**



1. Apparatus for cutting a tube into desired lengths of tubing comprising:

cutting dies mounted adjacent the outside of the tube;

die actuating means to produce relative motion between said dies with respect to the radial and circumferential dimensions of the tube;

puches located inside of the tube generally opposite said cutting dies;

restraining means forcibly movable in the tube; and

punch positioning means insertable through the end of the tube from which the length of tubing is to be cut to force and retain said punches against said restraining means during cutting of the tube, said restraining means having sufficient resistance to movement to maintain said punches between said restraining means and said punch positioning means and in the proper axial positions with respect to said cutting dies during cutting of the tube.

4,003,279

SHEARING TUBE STOCK

Richard Quentin Carmichael, Duxford; Roger George Bonelle, Walsall, and John Edward Hartley, Royston, all of England, assignors to T. I. (Group Services) Limited, Birmingham, England

Filed Apr. 8, 1975, Ser. No. 566,069

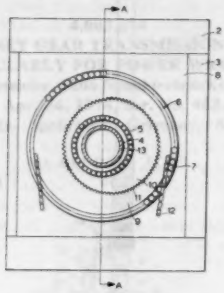
Claims priority, application United Kingdom, Apr. 9, 1974, 15603/74

Int. Cl.² B26D 1/00

U.S. Cl. 83—199 **5 Claims**

1. The method of shearing elongated stock by use of respective fixed and moveable apertured dies, the apertures of said dies corresponding in size to the stock, said moveable die being rotatably carried on an adjustable eccentric rotatably mounted on a non-rotatable linearly and laterally moveable slide block comprising the steps of presetting with a fixed eccentricity the eccentric on said slide block so that the axis of said moveable die is displaced a preset fixed distance from the axis of said eccentric, aligning the aperture in said moveable die with the aperture in said fixed die by moving said slide block laterally and linearly to a first position at which the axes of the apertures of said dies are coincident, inserting said stock through the aligned apertures of said dies, partially shearing said stock by moving said slide block laterally and linearly to a second position wherein the axis of said moveable die is laterally displaced relative to the axis of said fixed die, and thereafter rotating said eccentric to cause said moveable die to follow an orbital path relative to said fixed die and propagate said shearing around said stock.

4. Apparatus for shearing elongated stock comprising a first fixed apertured die and a second moveable apertured die, the apertures in said dies corresponding in size to stock to be sheared, means for displacing said moveable die laterally and linearly relative to said fixed die comprising a laterally and linearly moveable slide block, an eccentric rotatably mounted on said slide block, said moveable die being rotatably mounted on said eccentric with its axis parallel to the axis of



said eccentric, means for adjustably displacing the axis of said moveable die a preset fixed distance laterally of the axis of said eccentric, said slide block being linearly and laterally moveable in a direction normal to all of said axes between a first position in which the axes of said fixed and moveable dies are coincident and a second position in which said axes are relatively laterally displaced, and means for rotating said eccentric on said slide block after said slide block has been moved to its second position to cause said moveable die to follow an orbital path relative to said fixed die.

4,003,280

DRIVE DEVICE FOR WEB CROSSCUTTING APPARATUS

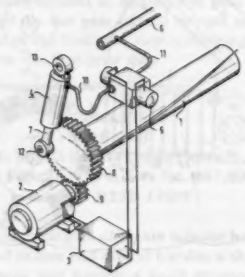
Walter Stuebinger, Nurenberg, Germany, assignor to BHS-Bayerische Berg Hutten-und Salzwerke Aktiengesellschaft, Munich, Germany

Filed Sept. 19, 1975, Ser. No. 614,846

Claims priority, application Germany, Sept. 30, 1974, 2446723

Int. Cl.² B26D 25/04, 1/56

U.S. Cl. 83—324 **5 Claims**



1. An apparatus for driving a device to crosscut a continuously moving sheet of material, particularly corrugated cardboard, comprising:

a drive motor connected with a rotary cutting roller;

a control device operable on said motor during a revolution of the roller to effect a selectable sectional length of the material and a synchronous cutting speed between the roller and the material; and

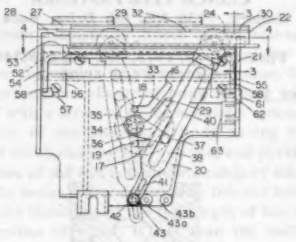
an air cylinder coupled to said roller and said motor and having an enclosed air volume to take up retardation energy by compression of the air volume and yield it by decompression of the air volume, thereby relieving the drive motor.

4,003,281

RECORD MATERIAL CUTTING MECHANISM

Sherman S. Kumpf, Dryden, and Robert W. Flood, Interlaken, both of N.Y., assignors to NCR Corporation, Dayton, Ohio

Filed June 10, 1975, Ser. No. 585,726
Int. Cl.² B26D 1/16, 1/20
U.S. Cl. 83—477.2 19 Claims



1. In a data terminal device constructed and arranged to perform recording operations on a record member, a mechanism for severing a record member including:

a. a slotted supporting surface for supporting a record member in a cutting position;

b. a ledge support member extending along said supporting surface, said ledge support member having an upstanding guide surface;

c. a cutting surface extending along said slotted supporting surface and in a direction parallel to said guide surface;

d. an arm assembly engaging said ledge support member and operable for movement along said ledge support member;

e. a support member mounted on said arm assembly for movement into engagement with said guide surface and positioned on said ledge support member for supporting said arm assembly for movement along said ledge support member;

f. a cutting member mounted on said arm assembly for movement into engagement with said cutting surface and positioned within the slot, said cutting member cutting the strip of material when moved along said cutting surface;

g. resilient means engaging said support member and said cutting member for moving said support member into engagement with said guide surface to guide the arm assembly along said ledge support member and for moving the cutting member into engagement with said cutting surface;

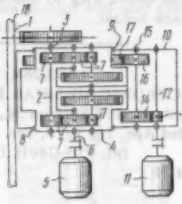
h. and means for operating said arm assembly during a cutting operation whereby said arm assembly will be guided along the ledge support member to move the cutting wheel along said cutting surface to cut the strip of material.

4,003,282

MACHINE FOR THE HOT SHEARING OF ROLLED PRODUCTS

Jury Stepanovich Komissarchuk, B. Cherkizovskaya ulitsa, 3, korpus 4, kv. 88; Nikolai Ivanovich Krylov, 1 Kuzminskaya ulitsa, 25, kv. 26; Boris Vasilievich Popov, Zelenodolskaya ulitsa, 24, kv. 110, and Viktor Davydovich Lurie, 2 Kabelnaya ulitsa, 10, kv. 19, all of Moscow, U.S.S.R.

Filed Jan. 30, 1975, Ser. No. 545,424
Int. Cl.² B23D 19/00; B26D 1/18
U.S. Cl. 83—490 10 Claims



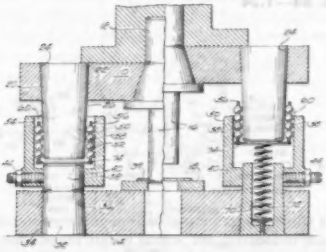
1. A machine for hot shearing rolled products comprising a carrier shaft in the nature of a hollow housing adapted to be mounted for rotation about a carrier axis; a disk shaft mounted on said carrier for rotation about a disk shaft axis, at least a portion of said disk shaft extending beyond said carrier; a serrated disk having a diameter and mounted on said disk shaft portion and adapted to rotate with rotation of the same; means at least partially enclosed in said carrier shaft for imparting rotary motion to said disk shaft and serrated disk; first bearings mounted on said carrier for rotatably supporting said disk shaft; a reducer having a housing, said carrier being mounted for rotation on said reducer housing; means for imparting rotary motion to said carrier through said reducer, said disk shaft being eccentrically spaced from said carrier axis to move said serrated disk along a circular path; a second bearing means having a diameter and mounted on said housing for rotatably supporting said carrier, the distance between said carrier and disk shaft axes being smaller than at least one of said disk and second bearing means diameters, whereby relatively high forces can be applied by said serrated disk to a product to be cut with a relatively small and compact machine.

4,003,283

DIE SET WITH TWO-PART LEADER PINS AND BALL BEARING GUIDE

Kasimir Janiszewski, 11908 W. Loomis Road, Franklin, Wis. 53132

Filed July 28, 1975, Ser. No. 599,756
Int. Cl.² B26D 7/00; F16C 19/00
U.S. Cl. 83—637 5 Claims



1. In a die set including a punch holder and a die shoe, the improvement comprising an assembly of an upper leader pin portion mounted on said punch holder and having a tapered

surface decreasing in diameter remote from said punch holder, a lower leader pin portion connected to said die shoe, a sleeve arranged around said lower leader pin and having a bore located in the path of travel of said upper leader pin, a ball bearing cage located in said bore and having a throat adapted to receive said upper leader pin tapered portion and guide said punch holder during reciprocal movement of said punch holder toward and away from said die shoe and means for supporting said ball bearing cage in said sleeve, said tapered surface, said sleeve bore and said ball bearing cage being sized to afford a tight shearing fit with the bearing balls pressing into the sleeve with no tolerance to minimize deflection of the punch holder.

4,003,284

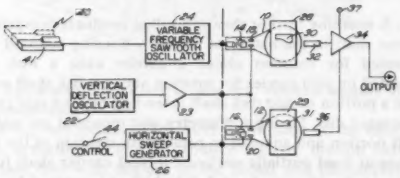
ELECTRONIC MUSICAL INSTRUMENT

David W. Marsh, II, 105 Sheldon St., Providence, R.I. 02906

Filed Apr. 10, 1975, Ser. No. 566,693

Int. Cl.² G10H *3/06*

U.S. Cl. 84—1.18 **8 Claims**



1. An apparatus for producing audible tones comprising a pair of electron beam guns having vertical and horizontal deflecting means, the output of the guns energizing a luminous screen means in the deflection path of each gun, a mask having thereon means for graphically depicting an image of a waveform representing a tone, located on the face of said luminous screen means, a mask being in the deflection path of each gun, means associated with each of the guns to vertically scan the luminous screen means, separate means associated with each gun to horizontally scan the face of the luminous screen means, light sensitive devices one each focused on the image generated by each of said masks, each light sensitive device converting the optical image representing a tone into an electrical wave, one light sensitive device having a constant output signal representing a tone, said one device modifying the output of the other devices to produce a particular timbre by varying amplitude of the other tones.

4,003,285

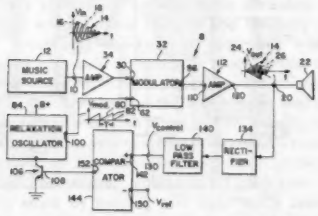
MUSIC SIGNAL CONVERSION APPARATUS

Louis A. Schwartz, 266 E. 211th St., Apt. 26, Bronx, N.Y. 10467

Filed Nov. 10, 1975, Ser. No. 630,744

Int. Cl.² G10H *1/04*

U.S. Cl. 84—1.24 **1 Claim**



1. Apparatus for converting an input music signal composed of sequential note signal envelopes having a relatively rapid rise time and a relatively slow fall time to an output music signal whose sequential note signal envelopes have a relatively slow rise time and a relatively rapid fall time, said apparatus comprising: an input port adapted to be coupled to a source for said input music signal; a relaxation oscillator means for producing an output signal composed of periodic signal elements of generally sawtooth shape in response to the application of electrical power to said oscillator means; each said signal element having an amplitude which increases with time; modulator means having a first input terminal coupled to said input port and having a second input terminal fed by said oscillator means; said modulator means having an output terminal coupled to said output port; electrically actuatable switch means positioned for selectively applying electrical power to said oscillator means; rectifying and low pass filtering means fed from said output port and having an output control signal indicative of the average value of output signal power at said output port; means for comparing said control signal with a predetermined reference signal; said comparing means being coupled to said switch means and being configured for actuating said switch means when said control signal exceeds said predetermined reference signal.

4,003,286

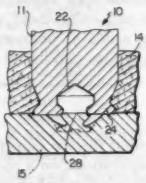
CLINCH TYPE FASTENER

Robert L. Hallock, 7136 NE. 8th Drive, Boca Raton, Fla. 33432

Filed Oct. 23, 1975, Ser. No. 625,349

Int. Cl.² F16B *15/00*

U.S. Cl. 85—31 **2 Claims**



1. In a clinch type fastener for attaching insulating material to thin sheet metal in which the fastener includes a generally cylindrical shank having a driving portion at one end and a penetrating portion at the opposite end, said penetrating portion having a generally frusto-conical exterior wall tapering inwardly toward the axis of said shank and terminating in a relatively blunt end, said penetrating portion having a cavity extending axially inwardly from said blunt end and defining a cavity wall, said penetrating portion having a pair of diametrically opposed slots extending inwardly from said blunt end generally parallel with the axis of said shank, said slots extending from said frusto-conical exterior wall to the cavity wall, the improvement comprising an enlargement located at the base of each slot, each enlargement having at least one portion extending outwardly of said frusto-conical exterior wall and defining stop means to limit penetration of said fastener into said sheet metal, said enlargements being spaced from said blunt end a distance substantially less than the thickness of the sheet metal, the side walls of the cavity adjacent to said slots tapering downwardly and inwardly toward the axis of said shank at an angle of substantially 5°, the side walls of the cavity remote from said slots tapering downwardly and outwardly from the axis of said shank at an angle of substantially 6°, said inwardly and outwardly tapered walls defining a pair of opposed U-shaped members at said blunt end and defining a generally elliptical configuration, and a shallow groove extending inwardly from the blunt end in a location remote from said slots, whereby a driving force applied axially of said shank causes the blunt end of said penetrating portion to penetrate partially through the sheet metal, extrude a pair of

bulbous masses into said cavity and cause the inwardly inclined walls of said cavity adjacent to said slots to collapse inwardly about the bulbous masses and firmly attach the fastener to the sheet metal without penetrating entirely therethrough.

4,003,287

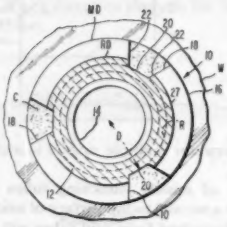
INSERT OF THE SELF-TAPPING FLUTED TYPE

Theodore Ziaylek, Jr., Yardley, Pa., assignor to Yardley Products Corporation, Yardley, Pa.

Filed July 8, 1975, Ser. No. 594,160

Int. Cl.² F16B *25/00*

U.S. Cl. 85—47 **6 Claims**



1. A fastener element or insert of the self-tapping type intended for engagement in a recess of a plastic article and having means for mating with a complementary fastener element, comprising; a cylindrical body formed with external threads and with a series of flutes angularly spaced about the circumference of the body, said body having tapered end portions and said flutes merging into said end portions short of the extremities of the body, the relationship of said flutes and threads in the sense of the dimensions thereof being selected such that upon threading of the full length of the insert into a recess the radius of which is less than the radial distance measured between the axis of the body and the point of greatest depth of a flute, chips removed by the insert threads will be trapped and compacted in the flutes to a density substantially duplicative of the density of undisturbed material contiguous to the compacted chips thereby to lock the insert in the recess.

4,003,288

TUBULAR RIVET

Harvey Philip Jeal, Stevenage, England, assignor to Aerpat A.G., Zug, Switzerland

Continuation of Ser. No. 439,030, Feb. 4, 1974, abandoned, which is a division of Ser. No. 260,832, June 8, 1972, abandoned, which is a division of Ser. No. 53,937, July 10, 1970, abandoned. This application Aug. 25, 1975, Ser. No. 607,444

Claims priority, application United Kingdom, July 28, 1969, 37689/69

Int. Cl.² F16B *19/10*

U.S. Cl. 85—77 **10 Claims**

5. A blind rivet for joining two side-by-side metallic sheets having aligned holes of substantially the same diameter therein, comprising an elongated shank, a radially enlarged head at one end of the shank and a bore extending throughout the length of the rivet,

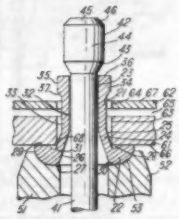
the shank having a tapering portion adjacent the head which tapers outwardly towards the head, a tail portion at the end remote from said head, and a cylindrical intermediate portion between said tail portion and said tapering portion,

the bore in said tail portion and said cylindrical intermediate portion of said shank being of substantially uniform diameter,

the external diameter of the wall of said cylindrical intermediate portion being substantially constant and the external diameter of said tail portion being greater than that of said cylindrical intermediate portion,

the taper of said tapering portion of said shank being both external and internal and such that the wall thickness of said tapering portion is substantially the same as the wall thickness of the cylindrical intermediate portion of said shank, with said bore in said tapering portion progressively increasing in diameter from said cylindrical intermediate portion through said tapering portion and said radially enlarged head, and

said radially enlarged head of said rivet having an annular recess formed on the side thereof facing toward said shank at the junction thereof with said externally tapered portion of said shank,



whereby blind placing of the rivet through a pair of said metallic sheets having aligned holes which have a greater diameter than the external diameter of said cylindrical intermediate portion of said rivet shank may be accomplished by pulling a mandrel head completely through the bore of the rivet in the direction toward its head thereby to contract the rivet axially and to expand radially at least said shank part of the rivet, the material from the cylindrical intermediate portion of said rivet shank being expanded radially against the walls of said holes in said metallic sheets and pushed along by the mandrel head in its passage through the rivet bore to reduce the size of the tapered bore in the head of the rivet and the material from the tapering portion of said rivet head being expanded into said annular recess to increase the thickness of said tapering portion and thus its strength.

4,003,289

GILL NET

Shigeru Yamashita, Okayama, Japan, assignor to Morishita Fishing Net Manufacturing Co., Ltd., Okayama, Japan

Filed Sept. 30, 1975, Ser. No. 618,145

Claims priority, application Japan, Oct. 4, 1974, 49-120566

Int. Cl.² A01K *69/02;* **D04G** *1/00*

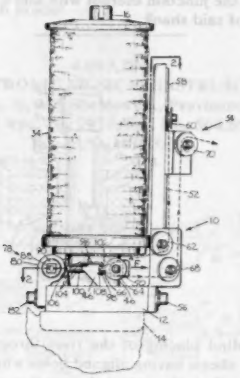
U.S. Cl. 87—12 **1 Claim**

1. A gill net comprising monofilament zigzag wefts alternating with monofilament zigzag warps, the vertices of the zigzags of said warps forming knots with the adjacent vertices of the zigzags of said wefts, said knots being double English knots and the monofilament of said wefts being of substantially smaller diameter than the monofilaments of said warps.

4,003,290
STRAND CARRIER FOR A STRAND FABRICATING MACHINE

Rudolf Herbert Haehnel, and Barry Lee Graeff, both of Reading, Pa., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed Apr. 23, 1976, Ser. No. 679,763
Int. Cl.² D04C 3/14; F16D 11/06
U.S. Cl. 87—57 7 Claims



1. A strand carrier for a strand fabricating machine comprising:

a support structure mounted on said machine;

a shaft mounted on said support structure;

a hub mounted on said support structure for rotation around said shaft and including means thereon for receiving a bobbin of strand on said shaft in a fixed relationship with said hub for common rotation about said shaft;

a helical clutch spring having a first end fixedly secured at said support structure, an intermediate portion which is biased to closely encircle an outer cylindrical surface of said hub to restrict rotation of said hub by generation of friction therebetween and a second end which is disposed outwardly of said hub;

a clutch release sleeve rotatably mounted on said support structure around said clutch spring and said hub, said sleeve being capable of rotation in a first direction to cause a surface portion thereof adjacent said clutch spring to contact and angularly displace said second end of said clutch spring which displacement tends to unwind said clutch spring to reduce said friction on said hub;

a control lever pivotally mounted on said support structure and having a first section and a second section thereon remote from an axis of rotation of said lever, said first section being adjacent said sleeve and having a strand guide thereon;

means for connecting said first section of said lever to said sleeve;

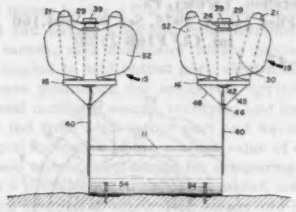
means for biasing said second section of said lever in a direction to cause said first section to rotate said sleeve in an opposite direction from said first direction; and

means for guiding said strand from said bobbin, to and around said strand guide of said first section, and to work area of said machine, said means for guiding being located with respect to said strand guide to cause said strand to apply a resulting force on said control lever in opposition to said means for biasing.

4,003,291
MISSILE LAUNCHING MINE

Oscar R. Vass, Adelphi, Md.; Leslie C. Taylor, Washington, D.C., and Charles A. Lewis, Silver Spring, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 20, 1964, Ser. No. 369,034
Int. Cl.² F41F 3/10
U.S. Cl. 89—1.810 8 Claims



2. An underwater multiple missile launcher comprising

a platform,

a plurality of missile launching tubes disposed at acute angles to a normal to the surface of said platform whereby missiles launched from said tubes will be launched along divergent paths which define a predetermined pattern, said tubes mounted for limited pivotal movement on said platform for compact storage in parallel positions and for movement to the acute angle positions upon deployment of the launcher,

an initially collapsed inflatable bag secured to said platform between said tubes for pivoting said tubes to their acute angle positions upon inflation thereof and for rendering said platform buoyant.

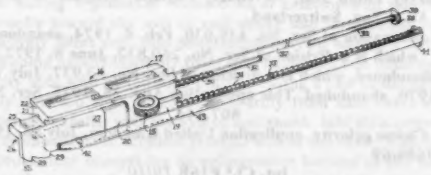
a mooring cable attached to said platform, and

anchor means connected to said mooring cable for holding said platform adjacent the sea bottom.

4,003,292
RIFLE

Nicolaos C. Christakos, 2832 N. Austin Ave., Chicago, Ill. 60634

Filed Sept. 12, 1975, Ser. No. 612,868
Int. Cl.² F41C 5/00
U.S. Cl. 89—145 5 Claims



1. A self-cocking rifle having a hollow breech housing comprising a firing chamber having open communication with an elongated barrel, wherein the improvement comprises

a. a breech block reciprocally movable through the breech housing,

b. a firing pin and cocking piece carried by said breech block simultaneously and independently reciprocally movable therewith through the breech housing,

c. independent coil springs for independently moving said breech block and said firing pin and cocking piece in one direction through the breech housing,

d. means extending into the breech housing and connected to said breech block and to said firing pin and cocking

piece, cooperating with said independent coil springs for moving said breech block and said firing pin and cocking piece independently in one direction through the breech housing,

e. a sear engaging said firing pin and cocking piece when the latter is moved with said breech block in an opposite direction through said breech housing for cocking the same against the action of its coil spring,

f. a trigger assembly for said rifle adapted to be pivoted about an axis transversely to the direction of movement of said breech block and said firing pin and cocking piece, and

g. means carried by said trigger assembly for disengaging said sear from said firing pin and cocking piece whereby the latter is moved by its coil spring independently of said breech block in one direction through the breech housing into firing position.

4,003,293

ANTI-RECOIL DEVICE FOR AUTOMATIC WEAPONS

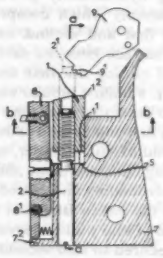
Jose-Maria Uria, 13, rue de Santiaga, and Antoine-Georges Uria, 15, rue de Theatre, both of 64700 Hendaye, Pyrenees Atlantiques, France

Filed Aug. 7, 1974, Ser. No. 496,016

Claims priority, application France, Aug. 10, 1973, 73.29938

Int. Cl.² F41C *27/00*

U.S. Cl. 89—198 **2 Claims**



1. An automatic weapon with a blowback breech block anti-kick buffer device, said weapon comprising a casing, a movable breech block displaceable on said casing, and means for the stoppage of the movable breech block at the end of its rearward strokes, said means including a restoring spring and a movable part whose mass becomes added to that of the breech block and to the force of the restoring spring in order to check the movement of the breech and produce progressive stoppage thereof, said movable part comprising a slideblock slidably constrained in lateral grooves provided in the casing, a threaded rod threaded into the slideblock to guide the same, the threaded rod being freely movable in a seat included in the casing, the slideblock including buffer pistons and springs which effect continuous contact of the pistons with the slideblock and casing and take part in the progressive stoppage, an abutment on said casing, the slideblock being provided with faces coming to rest against the abutment of the casing to limit the movement of the slideblock, a hammer tiltable on the casing, said rod being threadably advancable so that it protrudes from said slideblock and rests on the hammer which tilts horizontally on recoil of the breech block, thus preventing percussion when the weapon is required only to simulate firing for practice.

4,003,294

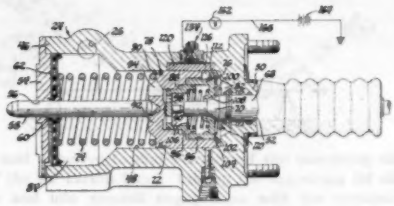
HYDRAULIC POWER MECHANISM WITH CONTROL DEVICE ACTUATOR

Donald L. Parker, Middletown, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 30, 1976, Ser. No. 681,771

Int. Cl.² F15B *13/02*

U.S. Cl. 91—49 **2 Claims**



1. In a hydraulic power mechanism having a housing; a power cylinder formed in said housing; a power piston reciprocably received in said housing and dividing said power cylinder into a power pressure chamber and an exhaust chamber and having passage means therein connecting said chambers; an open center control valve assembly in said passage means for controlling fluid passage therethrough from said power pressure chamber to said exhaust chamber and including a movable valve, an annular valve seat reciprocably received in a second cylinder defining a portion of said passage means, a reaction member reciprocably received in a third cylinder defining another portion of said passage means and also reciprocably received in a fourth cylinder formed in a part of said annular valve seat; spring means continually urging said reaction piston toward said exhaust chamber and said valve seat toward said power chamber and in valving relation with said valve; and a stop on said power piston normally engaged by said valve seat under influence of said spring means; the improvement comprising:

an actuating bar mounted in a recess formed in the wall of said housing power cylinder radially outward of said power piston, said bar extending axially at said power cylinder wall for a distance substantially equal to the power stroke of said power piston and continually lying in said power chamber;

said power piston having a radially extending aperture adjacent the end thereof facing said power chamber and opening into said second cylinder and into said power chamber in radial alignment with said bar;

a ball-receiving ramped groove in said valve seat in radial and axial alignment with said aperture with the groove ramp extending radially outward and axially toward said power chamber;

a ball in said aperture and said ramped groove and having a rolling point of contact with said bar in any operational axial position of said piston;

and radially extending spring loaded means spring loading said bar substantially centrally between the ends thereof to continually urge said bar into engagement with said ball and yieldably permit radially outward movement of said bar caused by radially outward movement of said ball, said spring loaded means when yieldably permitting such movement actuating a control device;

said ball being moved radially outward by axial movement of said valve seat and said ramped groove relative to said aperture, said axial movement occurring in response to axial engagement and subsequent concurrent movement of said valve and said valve seat relative to said power piston against the force of said spring means.

4,003,295

FLUIDIC CAPACITOR FOR TEMPERATURE INDEPENDENT RC TIME CONSTANTS IN LIQUIDS

Tadeusz M. Drzewiecki, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 10, 1975, Ser. No. 566,850
Int. Cl.² F15C *3/00*
U.S. Cl. 92—1 **9 Claims**

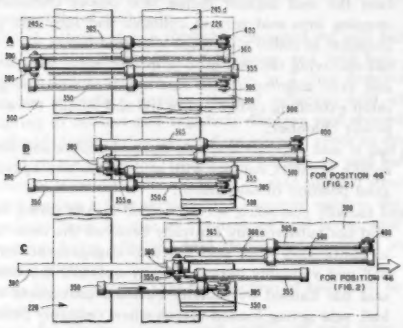
7. A fluidic capacitor for liquid comprising:
a. a chamber having a port for placing said chamber in fluid communication with a working fluid;
b. a piston forming one wall of said chamber;
c. a rigid frame attached to the other walls of said chamber;
d. a flexible beam irrotatably supported at both ends thereof by said rigid frame;
e. means for maintaining said flexible beam at the temperature of said working fluid; and
f. connecting means for transmitting fluid forces acting on said piston into normal forces acting on the center of said beam;
whereby the capacitance varies as the inverse of the working fluid viscosity.

4,003,296

STACKER CRANE CONSTRUCTION

Edward A. Wentz, Gaithersburg, Md., assignor to American Chain & Cable Company, Inc., Bridgeport, Conn.

Division of Ser. No. 314,159, Dec. 11, 1972, Pat. No. 3,934,741, which is a division of Ser. No. 198,917, Nov. 15, 1971, Pat. No. 3,792,758, which is a continuation of Ser. No. 840,667, July 10, 1969, abandoned. This application Mar. 27, 1975, Ser. No. 562,506
The portion of the term of this patent subsequent to Oct. 21, 1992, has been disclaimed.
Int. Cl.² F01B *15/00*
U.S. Cl. 92—66 **5 Claims**



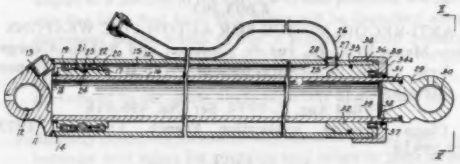
1. A hydraulic mechanism for driving a member selectively in opposite directions and to either of a pair of positions in either direction comprising a first pair and a second pair of double acting hydraulic cylinders;
each cylinder comprising a housing, and a piston rod extending from a rod end of said housing;
the housings of said first pair of cylinders being secured to each other and the housings of said second pair of cylinders being secured to each other.
means for securing one of the piston rods of said first pair of cylinders to one of the piston rods of said second pair of cylinders;
means for maintaining the other of the piston rods of said first pair stationary;
means for connecting the other of the piston rods of said second pair to said member;
selective pressurization of said first and said second pair of double acting cylinders effecting selective extension or withdrawal positions of respective piston rods effecting motion of said member selectively in either direction to a first or second position.

4,003,297

HYDRAULIC CYLINDER

Richard H. Mott, Sioux Falls, S. Dak., assignor to DU-AL Manufacturing Company, Sioux Falls, S. Dak.

Filed Mar. 28, 1975, Ser. No. 563,125
Int. Cl.² F15B *21/04*; F16J *15/18*, *9/00*
U.S. Cl. 92—78 **9 Claims**



1. A double acting hydraulically powered cylinder and hollow piston rod assembly which comprises an elongated tubular cylinder with first and second ends and a smooth cylindrical inner wall surface between said ends, a first connector secured to and closing the first end of said cylinder having a first fluid port, a hollow tubular elongated piston rod of substantially smaller outer diameter than the inner diameter of said cylinder having first and second ends and being slidable through said second end of said cylinder, said outer diameter of said piston rod being constant along the full length of the rod, a piston sleeve surrounding and seated on the first end of said piston rod along the entire length of the sleeve, a weld bond securing one end of said piston sleeve to said piston rod, a second connector secured to said second end of said piston rod extending beyond the second end of said cylinder, a guide sleeve in said second end of the cylinder between said piston rod and cylinder and slidably supporting said piston rod in the cylinder, said piston sleeve having wear ring grooves thereabout adjacent the opposite ends of the sleeve and a backup ring groove therearound between said wear ring grooves, a wear ring mounted in each wear ring groove projecting radially therefrom in bearing engagement with said smooth cylindrical inner wall surface of said cylinder, a backup ring mounted in said backup ring groove and projecting radially therefrom, a seal ring surrounding said piston sleeve on each side of said backup ring between the backup ring and wear rings, and a second fluid port in said cylinder adjacent said guide sleeve communicating with a space between said piston rod and said cylinder, whereby fluid introduced into the first port will be sealed from said space between the piston rod and cylinder and the second port by said piston sleeve and said seal rings around the sleeve to fill and propel the piston rod for moving the second connector away from the first connector while fluid introduced into the second port will fill the space between the piston rod and cylinder and be sealed from the first port and interior of the piston rod by said piston sleeve and said seal rings around said piston sleeve to retract the piston rod into the cylinder and move the second connector toward the first connector.

4,003,298

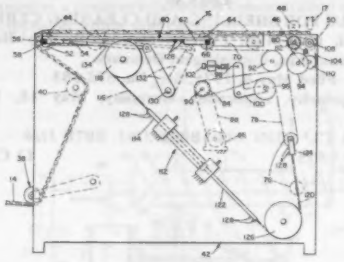
APPARATUS FOR DRIVING MOVING WEBS IN BAG MAKING MACHINES

Charles M. Schott, Jr., Gloucester, Mass., assignor to Gloucester Engineering Co. Inc., Gloucester, Mass.

Continuation of Ser. No. 548,585, Feb. 10, 1975, abandoned. This application Feb. 9, 1976, Ser. No. 656,814

Int. Cl.² B31B *23/02*

U.S. Cl. 93—33 H **21 Claims**



1. In a machine for discontinuously driving a web moving continuously through the machine, said machine having web pulling means, a web shuttle mounted to said machine for reciprocation toward and away from said web pulling means, said web shuttle adapted to have said web trained thereabout, shuttle drive means for reciprocally moving said web shuttle to alternately take up and pay out said web, and an endless looped belt drivingly interconnecting said web pulling means and said web shuttle so that a portion of said belt associated with said web pulling means can stop and start interdependently with the take-up and pay-out movements of said web shuttle and synchronously with the take-up and pay-out of said web, thereby stopping and starting said web pulling means interdependently with said take-up and pay-out movements, the improvements in which:

said web shuttle comprises a pair of shuttle members, a first said shuttle member positioned upstream and a second said shuttle member positioned downstream relative to the direction of web movement through said machine, each said shuttle member being independently mounted in said machine for reciprocation, a portion of the loop of said belt extending about each said shuttle member, said shuttle drive means being connected to said shuttle members from outside said portions of the loop of said belt extending about said shuttle members, and said drive means synchronously securing said members against said portions of the loop of said belt for reciprocating said shuttle members in unison, thereby stopping and starting said portion of said belt associated with said web pulling means and simultaneously stopping and starting said web.

4,003,299

PACKING SYSTEM

Michael Sternheimer, Pavillonstrasse, Germany, assignor to Astra-Werke GmbH Druck & Verpackung, Saarlouis, Germany

Filed Mar. 27, 1975, Ser. No. 562,558

Claims priority, application Germany, Apr. 18, 1974, 2418694

Int. Cl.² B31B *1/26, 17/00*

U.S. Cl. 93—49 M **12 Claims**

1. A method of making boxes from carton blanks, of the type having either flap tops or push-on lids and which after being formed and covered with paper are incised along edges of the box lid opening, comprising the steps of: adding a substantially quick-settling adhesive to and margins of opposed side flaps of a lid carton blank; positioning a base carton blank in aligned registered disposition beneath the lid carton blank and spaced therefrom a predetermined distance corresponding to the width of the finished box; erecting to a substantially vertical positon side flaps of the base carton blank underlying the lid side flaps carrying adhesive; folding the lid side flaps carrying adhesive to and into pressed engagement with the vertical base side flaps; erecting to a substantially vertical position the remaining side flaps of the base carton blank;

adding said adhesive to end margins of the remaining side flaps of the lid carton blank; folding the remaining lid side flaps to and into pressed engagement with the remaining vertical base side flaps, thereby forming a closed box; applying a paper covering to the closed box; and incizing and severing the outer side flaps of the box lid at predetermined locations.

4,003,300

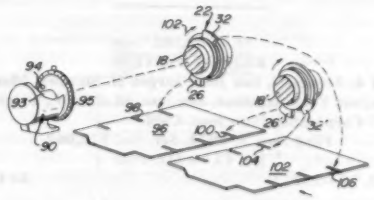
APPARATUS HAVING DUAL SLOTTER SHAFTS

William Grobman, Philadelphia, Pa., assignor to Molins Machine Company, Inc., Camden, N.J.

Continuation-in-part of Ser. No. 504,934, Sept. 11, 1974, Pat. No. 3,954,050. This application Apr. 9, 1976, Ser. No. 675,369

Int. Cl.² B31B *1/22*

U.S. Cl. 93—58.2 R **7 Claims**



1. Apparatus for processing planar box blanks comprising a pair of shafts mounted for rotation about their longitudinal axes, an annular head connected to each shaft for rotation therewith, at least one slotter knife releasably mounted on said head and projecting beyond the periphery of said head, means for releasably locking each knife to its head, motor means for rotating said shafts through a preselected angle, and means for releasing said locking means and retaining said slotter knife stationary so that said shafts may be rotated by the motor means through the preselected angle whereby the position of the slotter knives on the heads may be adjusted to the same or different positions on said shafts depending on whether one or two blanks is to be processed per revolution of the shafts.

4,003,301

VACUUM RELIEF SYSTEM FOR TARPAULIN COVERED HOPPER TRAILERS

Morrison Kai Norton, Woodland, Calif., assignor to Titan Trailer Corporation, Woodland, Calif.

Filed Nov. 10, 1975, Ser. No. 630,336

Int. Cl.² B61D *7/32*

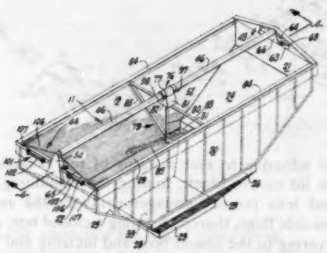
U.S. Cl. 98—13 **10 Claims**

1. Vacuum relief system for hopper trailer having opposing end walls and opposing side walls defining a horizontal upper rim, a bottom including a cargo discharge door, and a tarpaulin covering the trailer hopper and extending around the upper

rim in substantially air tight relation thereto, said system comprising:

a. an elongated hollow tube;

b. means for mounting said tube on the opposing end walls of the hopper at an elevation above the level of the upper rim, said tube extending the entire distance between the end walls and being located below and in supporting relation to the tarpaulin to elevate the same above the level of the upper rim;



c. orifice means mounted on the hopper and connected to said tube for establishing communication between the atmosphere and said tube; and,

d. nozzle means on said tube for venting atmospheric air from said tube to a location below the tarpaulin, said tube being effective to conduct atmospheric air from said orifice means to a space between the tarpaulin and the subjacent contents of the hopper to equalize the air pressures on both sides of the tarpaulin as the contents of the hopper are withdrawn through the cargo discharge door.

4,003,302

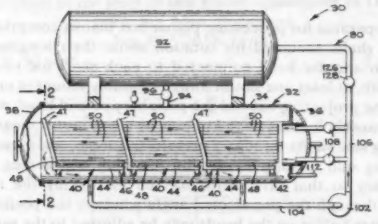
RETORT SYSTEM

Samuel A. Mencacci, San Jose; Jurgen H. Strasser, Mountain View, and Tom Mansfield, San Jose, all of Calif., assignors to FMC Corporation, San Jose, Calif.

Filed Nov. 8, 1974, Ser. No. 522,067

Int. Cl.² A23L *3/02*

U.S. Cl. 99—359 **24 Claims**



1. A retort system for changing the temperature of substantially flat containers having thin flat sidewalls with high heat penetration rates, said system comprising a vessel having an enclosing outer wall and a longitudinal axis, imperforate wall means defining a tunnel disposed within said vessel spaced from at least a portion of said outer wall thereof and having an inlet end and an outlet end for liquid, said imperforate wall means extending between said inlet end and said outlet end to confine the flow of liquid within said tunnel, flow inducing means for moving a heat treatment liquid at a predetermined temperature through said tunnel and past the containers to transfer heat between the containers and the liquid, said flow inducing means thereafter returning the liquid discharged from the tunnel externally of the tunnel between said tunnel and said outer wall of the vessel to the inlet end of the tunnel for recirculation through said tunnel, means for supporting the containers in the tunnel in positions spaced apart in a direction perpendicular to the flow path through the tunnel and so that the flat sidewalls thereof are parallel to the flow direction of the heat treatment liquid, and means for returning the temperature of the liquid to said predetermined temperature as the liquid is moving externally of said tunnel toward said inlet end.

4,003,303

APPARATUS FOR SHELLING AND CLEANING CEREALS

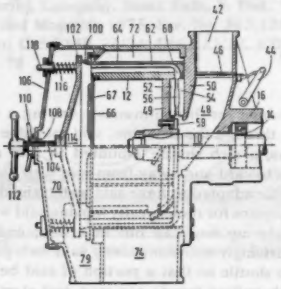
Leslie Palyi, Don Mills, Canada, assignor to Palyi-Hansen International Aps, Copenhagen, Denmark

Filed May 8, 1975, Ser. No. 575,503

Claims priority, application Germany, May 15, 1974, 2423659

Int. Cl.² A23N *5/00;* **B02B** *3/02;* **B07B** *1/20*

U.S. Cl. 99—575 **12 Claims**



1. Apparatus for shelling and cleaning cereals, grain, or the like comprising:

a housing; a horizontal shaft in said housing;

a drum rotatably mounted on said horizontal shaft; said drum having opposite first and second end faces which are closed and having an annular exterior;

a perforated cylinder defined around said horizontal axis and annularly surrounding and spaced from said drum to define an annular axially extending gap between said cylinder and said drum; said perforated cylinder having an exterior side outside said annular axially extending gap;

said housing having an inlet side near said first end face of said drum; an inlet to said housing at said inlet side and communicating into said annular axially extending gap;

said perforated cylinder having an end that is near said drum second end face; an annular lip seal formed on and extending beyond said end of said perforated cylinder; said lip seal being comprised of resilient material;

a cover in said housing and positioned in opposed relationship to said lip seal; means for shifting said cover away from and also toward and into varying degrees of secure engagement with said lip seal.

4,003,304

SCREW PRESS

Rolf Bertil Reinhall, 834 171st Place NE., Bellevue, Wash. 98008

Filed Apr. 14, 1975, Ser. No. 567,862

Claims priority, application Sweden, Apr. 30, 1974, 7405816

Int. Cl.² B30B *9/12*

U.S. Cl. 100—117 **4 Claims**

1. A continuous flow dewatering press for fiber pulp suspension comprising:

a. an inlet channel for receiving the pulp to be dewatered;

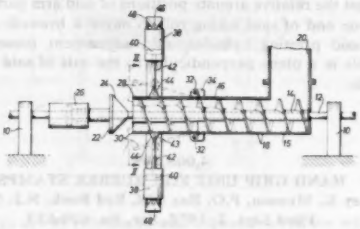
b. a tubular compression casing having an inlet connected

to said inlet channel and an outlet at the opposite end thereof;

c. means for advancing the fiber pulp from the inlet end to the outlet while progressively compressing and dewatering the same;

d. a plurality of perforations in the walls of said tubular casing to permit water to drain therefrom as the fiber pulp is advanced therein,

e. adjustable throttling means at the outlet end of said casing for controlling the rate of liquid discharge and to maintain a predetermined pulp concentration in said pulp suspension within said casing;



f. flaps forming a substantially aligned extension of said tubular casing adjacent the outlet thereof and normally enclosing said pulp advancing means thereof;

g. said flaps being hinged to said casing to swing outwardly about an axis perpendicular to the axis of said tubular casing to provide a flared mouth facing said throttling means, and

h. means for exerting a predetermined maximum yielding pressure on said flaps to maintain said flaps substantially aligned with the unhinged portion of said casing until the pressure produced by the compression of the fiber pulp exceeds said predetermined maximum.

4,003,305

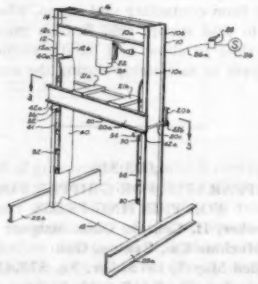
PRESS FRAME

Roy L. King, Rte. 11, Staunton Bridge Road, Greenville, S.C. 29611

Filed Apr. 27, 1976, Ser. No. 680,726

Int. Cl.² B30B *15/06*

U.S. Cl. 100—257 **6 Claims**



1. In a frame for a press machine having a pair of spaced parallel leg members, a cross beam member bridging the ends of said leg members adjacent one of the ends thereof, a second cross beam member bridging the remote ends of said leg members, a press bed carried transversely by said leg members being adjustable in position along the length thereof intermediate said first and second cross beam members, a jack means carried by said first cross beam member having a ram pin movable towards said press bed for engaging a workpiece supported on said bed, the improvement comprising at least one abutment supporting element integrally carried on each of said leg members for supporting an abutment member, said press bed having a lower most edge surface disposed adjacent said leg members for being supported on said abutment members when placed on said supporting elements at a desired position along the length of said leg members, and a bridge member carried by said frame adjacent each said leg member extending over said abutment supporting element to define a space between a respective leg member and bridge member between which said abutment member is retained on said supporting element while providing increased strength to said leg members and frame reducing the tendency of said leg members to bow outwardly under increased stress.

4,003,306

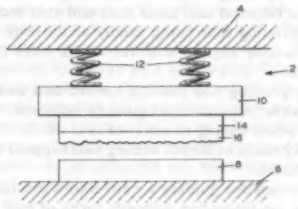
PRESS FOR EMBOSSING CEILING TILE

John R. Garrick; Nathaniel E. Hager, Jr., and Ernest B. Waters, Jr., all of Lancaster, Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Continuation-in-part of Ser. No. 155,418, June 22, 1971, abandoned. This application July 23, 1973, Ser. No. 381,859

Int. Cl.² B44B *5/02*

U.S. Cl. 101—27 **2 Claims**

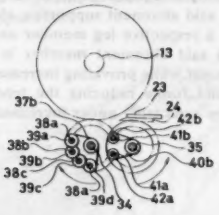


1. An apparatus for rapidly embossing a ceiling panel means made of fibrous material by the use of a cyclically operated punch press having a drive means and having a punching die moved by said drive means and a stationary platen for holding the fibrous product to be embossed, said punching die having a stripper plate, spring means being mounted between said punching die and said stripper plate, a high output heat generating means with temperature control means mounted on the stripper plate, an embossing plate means mounted on the heat generating means to be warmed by said heating generating means and for embossing the fibrous product, said high output heat generating means being capable of supplying heat at such a rate that said embossing plate can deliver a heat flux of at least 10 kilowatts per square foot to the product with the embossing plate maintaining a substantially constant temperature whereby the first part of the downward movement of the punching die to the fibrous material to be embossed will cause the heated embossing plate to engage the product, said springs between the punching die and stripper plate are compressed during the second part of the downward movement of the punching die, then upward movement of the punching die away from the fibrous product will let the spring means expand and result in the embossing plate being held against the product until almost the end of the upward movement of the punching die to result in an extended contact of the embossing die with the product and then with final upward movement of the punching die there is a quick release of the embossing plate from the product.

4,003,307
PRINTER

Seizaburo Sano, and Takaaki Kozima, both of Yokohama, Japan, assignors to Amano Corporation, Yokohama, Japan

Filed Oct. 15, 1974, Ser. No. 514,609
Int. Cl.² B41L 47/46
U.S. Cl. 101—45 2 Claims

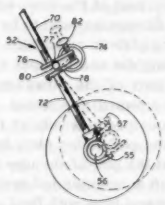


1. A printing mechanism comprising:
a. a base;
b. a plurality of type wheels mounted on said base for rotation about a common first axis in axially juxtaposed relationship, each type wheel having a peripheral face and carrying type on said face thereof;
c. a support movably mounted on said base;
d. a printing roll shaft mounted on said support for rotation about a second axis extending in a common direction with said first axis;
e. mounting means on said shaft;
f. a plurality of printing rolls secured to said mounting means for rotation about respective third axes parallel to said second axis in angularly offset relationship,
1. said mounting means maintaining fixed, equal distances between said third axes and said second axis,
2. said printing rolls being axially offset from each other and radially aligned with respective ones of said type wheels,
3. each printing roll moving toward and away from an operative position contiguously adjacent the aligned type wheel during rotation of said shaft;
g. yieldably resilient means biasing said support toward said type wheels;
h. guide means for guiding a card into a printing position, pressure on respective opposite faces of said card being simultaneously exerted by one of said type wheels and the aligned printing roll in the operative position of said aligned printing roll when said card is in said printing position thereof; and
i. drive means responsive to movement of said card into said printing position for rotating said shaft.

4,003,308
INK ROLL POSITIONING APPARATUS FOR PRESS

Charles E. Decker, II, Canton, Ohio, assignor to The Dillon Electric & Machine Co., Canton, Ohio

Filed May 7, 1975, Ser. No. 575,410
Int. Cl.² B41F 31/30
U.S. Cl. 101—351 5 Claims



1. In a printing press including a frame means comprising a pair of opposed side plates, a printing cylinder journalled on and extending between said side plates, and an inking roll adjacent said printing cylinder, and characterized by a positioning arm mounted on each side of said plates each engaging an end of said inking roll for pivotal movement thereof towards and away from said printing cylinder, one of said positioning arms having two axially spaced parts, fluid actuated means operatively engaging both of said positioning arms to move said inking roll to and from operative association with said printing cylinder, said fluid actuated means including connection means and a first adjustment means to control the position of said inking roll in relation to said printing cylinder; and said one of said positioning arms includes an arcuately movable second adjustment means connecting said arm parts to adjust the relative arcuate positions of said arm parts and of only one end of said inking roll to move it towards or away from said printing cylinder, said adjustment means being movable in a plane perpendicular to the axis of said printing cylinder.

4,003,309
HAND GRIP UNIT FOR RUBBER STAMPS

Whitney K. Munson, P.O. Box 828, Red Bank, N.J. 07701

Filed Sept. 2, 1975, Ser. No. 609,653
Int. Cl.² B41K 1/56
U.S. Cl. 101—406 13 Claims

1. A hand grip unit for a stamp comprising a connecting means and a rigid handle portion defined by a hollow portion including a closure for said hollow portion, said closure comprising a flexible membrane being a one piece continium of the handle portion and extending across said closure, said flexible membrane having extending therefrom said connecting means which comprises a connecting stud for connecting the unit to a stamp medium, and means for preventing the handle portion from contacting said stamp, when said handle is connected to said stamp, said flexible membrane being sufficiently flexible to allow said handle portion to flexibly pivot with respect to said stamp during the stamping operation.

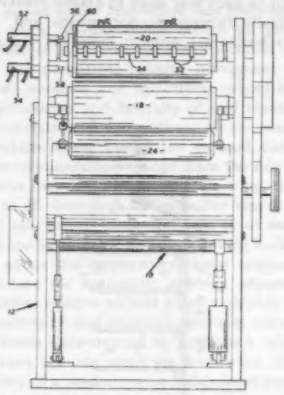
4,003,310
CONTROL APPARATUS FOR GRIPPER FINGER SHAFT FOR PRINTING PRESS

Charles E. Decker, II, Canton, Ohio, assignor to The Dillon Electric & Machine Co., Canton, Ohio

Filed May 7, 1975, Ser. No. 575,411
Int. Cl.² B41F 1/30, 21/04
U.S. Cl. 101—411 5 Claims

1. In a printing press including a frame, a plate cylinder, a driven impression cylinder having a gripper finger shaft with gripper fingers, a tumbler secured to one end of the gripper finger shaft, the improvement comprising said tumbler having pin receiving recess means on one side thereof at each of its ends, and a pair of fluid actuated cylinders having piston rods operated thereby and extending from said cylinders, said cylinders and piston rods being so positioned adjacent an end

of the impression cylinder as to engage said tumbler when a said piston rod is extended to turn it and its associated shaft



through an arc by rotation of said impression roll but with said piston rods turning said tumbler in opposite directions.

4,003,311
GRAVURE PRINTING METHOD

Karl D. Bardin, 100 Water St., Guilford, Conn. 05437

Filed Aug. 13, 1975, Ser. No. 604,221
Int. Cl.² G03F 1/00; B41C 1/02
U.S. Cl. 101—426 11 Claims

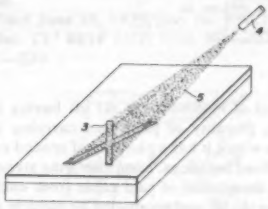
PREPARE FILM OF TONE IMAGES TO DENSITY SPECIFICATIONS
SELECT SUBSTRATE AND INK BASED ON CUSTOMERS PREFERENCE
TRANSFER IMAGES TO RESIST
ENGRAVE TEST CYLINDER
TEST RUN OF PRESS UNDER NORMAL OPERATING CONDITIONS WITH TONE SCALE TEST CYLINDER
MEASURE CELL GEOMETRY ON TONE SCALE TEST CYLINDER
ADJUST PRESS VARIABLES IF NECESSARY TO OBTAIN PRINT SAMPLES
MEASURE AND RECORD DENSITY OF TONE IMAGES ON PRINT SAMPLES
PLOT DENSITY VALUES OF THE IMAGES ON PRINT SAMPLES TO OBTAIN OPTIMUM REPRODUCTION CURVE
SELECT A TONE SCALE (RUN DATA FROM TEST RUN AND KNOWN GEOMETRY OF TEST CYLINDER
PREPARE SPECIFICATIONS IN TERMS OF CELL GEOMETRY FOR PREPARATION OF PRODUCTION CYLINDERS
CHECK PRODUCTION PRINT DENSITY VALUES AGAINST ORIGINAL COPY FOR CONFORMITY

1. A method of gravure printing which comprises providing a gravure press with a test cylinder having engraved thereon a tone scale chart comprising a plurality of tone scales each characterized by a plurality of spaced image areas ranging from a deep shadow tone to a light shadow tone with the deep shadow tones differing by a known density increment and the density of the tone image areas in each scale varying by a predetermined density value, the cell geometry of the tone image areas on the tone test cylinder being measured and recorded, operating said press with the test cylinder and a selected substrate and an ink formulation selected according to copy to be reproduced, varying the press operating conditions to obtain the best printed samples of commercially acceptable quality, measuring and recording the density values of the tone image areas on the printed samples obtained and plotting the density values thereof against the density values of the tone chart to determine the tone scale which has points of closest correspondence throughout a range of density values of the corresponding tone scale on the tone scale chart and which will result in optimum reproduction by said press, and setting up a specification in terms of cell geometry, derived from the cell geometry of the corresponding tone scale on the test cylinder, for the deepest shadow, middle and light tone values as measured on the copy, which specifications are to be met in the production of photographic film, image transfer and etching of production cylinders so as to obtain optimum reproduction of the copy on said press.

4,003,312
PREPARING WATERLESS LITHOGRAPHIC PRINTING MASTERS BY INK JET PRINTING

Wolfgang H. H. Gunther, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 16, 1974, Ser. No. 533,035
Int. Cl.² B41C 1/10; G01D 15/18
U.S. Cl. 101—466 1 Claim

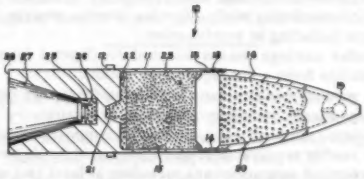


1. A process for preparing a printing master comprising coating a master substrate with a silicone curable to an elastomeric adhesive ink releasing condition, said silicone having reactive pendant groups, selectively imaging the resultant coated substrate by discharging an imaging fluid from an ink jet printing apparatus as droplets by selectively emitting or deflecting said droplets in accordance with an information source wherein the imaging fluid is an ink-accepting material having groups reactive with the silicone pendant groups, curing the silicone to an adhesive ink releasing condition, and grafting the imaging material to said silicone.

4,003,313
PROJECTILE

Walter J. Puchalski, Southampton, Pa., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 10, 1975, Ser. No. 585,649
Int. Cl.² F42B 13/14, 13/34
U.S. Cl. 102—66 3 Claims



1. A projectile comprising,

a projectile main body having a forward nose portion secured to said main body, a substantially cylindrical peripheral wall portion, and a rearwardly opening cavity containing a pyrotechnic composition,

said cavity having a substantially cylindrical sidewall, said cavity sidewall having a diameter substantially smaller than that of said peripheral wall portion, and

a rearward portion of said projectile having means including

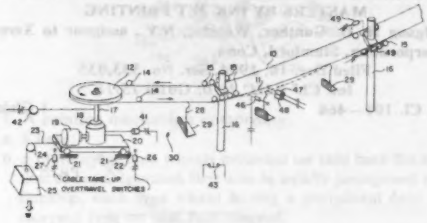
an uninterrupted conical surface for interconnecting the rearmost surfaces of said main body and cavity sidewall, said uninterrupted conical surface defining an empty frusto-conical chamber rearward of said pyrotechnic composition.

4,003,314

SKI LIFT MONITORING

William F. Pearson, 5221 Duvall Drive, Washington, D.C. 20016

Filed Apr. 25, 1975, Ser. No. 571,851
Int. Cl.² B61B *12/06*
U.S. Cl. 104—1 R **17 Claims**



1. A method of monitoring a ski lift having a drive cable transporting a plurality of passenger carrying units along a conveying run where it has a plurality of spaced cable supports at respective fixed locations, comprising the steps of: automatically sensing derailment of said cable from each of the supports along the ski lift and producing an electric signal at each such location indicating cable derailment, with such derailment electric signals differing from each other electrically in a fixed correlation with their respective locations for identification; controlling the starting and stopping of the ski lift with an electrical closed series circuit; transmitting in the closed series circuit all of said electric signals that have different electric identity characteristics to a central location remote from the signal source fixed locations; automatically identifying any one of said electric signals as to its location according to its different electric characteristic; automatically storing the thus identified signal according to its source identity and providing a visual display of the signal source location at said central location.

4,003,315

CONVEYOR CARRIAGE AND LADING SUPPORTING RACK

C. Richard Barth, 2908 Rockbrook Drive, Plano, Tex. 75074

Filed June 19, 1975, Ser. No. 588,512
Int. Cl.² B61B *3/00;* **B65G** *17/16, 17/24, 17/34*
U.S. Cl. 104—93 **5 Claims**

1. Apparatus adapted for transfer of products through stages of processing while allowing interim storage of such products including in combination:

a. roller carriage means adapted to depend in a rolling relation from a conveyor track means;

b. a vertical swivel means depending from said roller carriage means and supporting a hook means;

c. a tiered carrier means including a support bar supported in readily removable relation from said hook means;

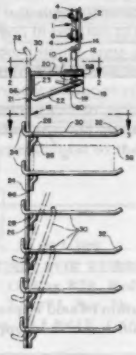
d. a vertical support means including at least two vertically disposed and laterally spaced apart support members connected to a bracket means extending laterally from said support means into connection with said support bar with said support bar being mounted at substantially the horizontal center of gravity of said tiered carrier means to provide and maintain a substantial vertical posture of said tiered carrier means;

e. a plurality of vertically spaced apart yokes mounted in transversely aligned relation to said vertically disposed support means;

f. a plurality of support shafts each being received in and supported by at least two said transversely aligned yokes;

g. at least two substantially horizontal support members connected to each said shaft to extend transversely from said vertically disposed support means; and

h. said two horizontal support members being also connected to a positioning bias means which engages at least one of said vertical support members to support said horizontal support members in said horizontal position and adapted to allow the combination of said shaft and said horizontal support members to be pivoted upwardly then be readily removed from said tiered carrier such as for cleaning.

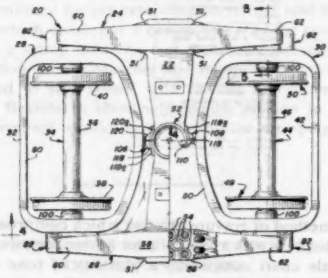


4,003,316

ARTICULATED RAILWAY CAR TRUCKS

Dale E. Monselle, 116 S. 44th St., Omaha, Nebr. 68131

Filed Oct. 23, 1973, Ser. No. 408,469
Int. Cl.² B61F *3/08, 5/12, 5/26, 5/38*
U.S. Cl. 105—167 **32 Claims**



1. A railway truck comprising a truck assembly for supportably engaging a railway vehicle, said assembly including a transverse center structure and rigid side members having portions disposed on opposite sides of each end of said center structure, each of said side member portions being spaced longitudinally of said assembly from said center support structure, a pair of pivot assemblies disposed one on each side of said center structure for supporting said truck assembly, each of said pivot assemblies including a pair of transversely spaced wheels connected by an axle and a wheel holding frame means supported on said axle and extending in underlying relation to said side member portions on the respective side of said center

structure, support means positioned between each of said side member portions and the respective underlying wheel holding frame means and including compressive resilient means between and joined to the respective side member portion and underlying wheel holding frame means for providing cushioned support of said side member portions on said pivot assemblies and permitting relative movement between said side member portions and underlying wheel holding frame means longitudinally and laterally of said truck assembly by resilient deformation of said resilient means, and each of said pivot assemblies being connected to said center structure through a pivot connection spaced from the axis of rotation of the respective pair of wheels and allowing limited pivotal movement in all directions between the respective pivot assembly and said center structure, said pivot assemblies supporting said truck assembly and each having horizontal pivotal movement about the respective pivotal connection to said center structure for automatic steering adjustment of said pivot assemblies relative to said truck assembly by such resilient deformation of said resilient means in response to track curve conditions encountered by said truck whereupon said resilient means provide restoring forces for returning each pivot assembly to a predetermined alignment position relative to said truck assembly.

4,003,317

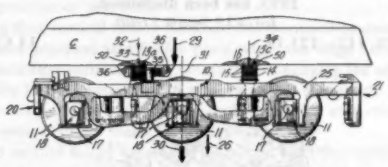
RESILIENTLY CENTERED RAILWAY TRUCK SUSPENSION

John Henry Parker, 730 St. Aubin, St. Laurent, Quebec, and Frank Thomas McInerney, 190 de Normandie, St. Bruno, Quebec, both of Canada

Continuation-in-part of Ser. No. 269,549, July 7, 1972, abandoned. This application Feb. 27, 1974, Ser. No. 446,393

Int. Cl.² B61F *1/14, 3/06, 5/20, 5/24*

U.S. Cl. 105—184 **1 Claim**



1. A locomotive truck including a secondary suspension for use on a railway three-axle truck frame, each of said three axles being equidistantly spaced from one another and being driven by a respective traction motor mounted on bearings on each axle and additionally supported by said truck frame, said secondary suspension comprising three identical laminated metal and rubber pads of cylindrical shape and circular cross-section positioned between the upper surface of said truck frame and said locomotive chassis, the laminated pads each having substantially zero shear rate horizontally in all directions when subjected to a vertical load by the mass of one end of the locomotive chassis supported thereby two of said pads being positioned forwardly of the central axle of said three axles and to a respective side of the central longitudinal axis of said truck frame, the other pad being positioned on said central longitudinal axis rearwardly of said central axle, said spacing of said pads relative to said central axle being predetermined to apply a resultant force of the mass of one end of said locomotive chassis forwardly of the central axle with all three pads equally loaded by said one end of the locomotive chassis whereby said resultant force will balance the resultant force of the truck sprung masses which is rearwardly of said central axle thereby giving a net resultant rail force substantially at said central axle, approximately two-thirds of the mass of one end of the locomotive chassis being supported on said two pads positioned forwardly of the central axle, said two pads being located approximately one-third the distance from an outboard end of the truck frame, and approximately one-third of the mass of the one end of the locomotive chassis being supported on said other pad positioned rearwardly of the central axle and approximately one-third the distance from an inboard end of the truck frame, the truck frame having a centre pin extending upwardly therefrom to engage the locomotive chassis to provide a traction connection therebetween, said centre pin being located on the truck between the two laminated pads and in longitudinally-spaced relation from the central axle; the centre pin engaging a pair of elastic pads mounted in a support block situated on a lower surface of the locomotive chassis, the two elastic pads extending horizontally between the centre pin and the support block and being positioned so as to transmit the traction forces and provide a lateral restoring force to the locomotive chassis.

4,003,318

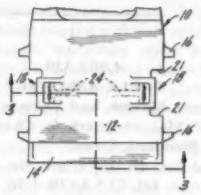
REINFORCED BOLSTER POCKET WALL

Robert L. Bullock, Lombard, and Robert P. Geyer, Palatine, both of Ill., assignors to Standard Car Truck Company, Chicago, Ill.

Filed June 25, 1975, Ser. No. 590,293

Int. Cl.² B61F *5/12, 5/16, 5/24, 5/50*

U.S. Cl. 105—226 **1 Claim**



1. A bolster for use in a stabilized railroad car truck, said bolster having a top wall and stabilizer pockets on each side of each end thereof, each of said pockets including a slanted interior wall, portions of said bolster adjacent said pockets extending above said top wall, and reinforcing means for said bolster pocket slanted interior walls positioned generally at the midpoint of each pocket and generally inside of said bolster, said reinforcing means including a rib behind each pocket and inside of said bolster, said ribs extending generally inwardly from each pocket and generally perpendicular to the longitudinal axis of said bolster, those portions of said bolster which extend above said top wall extending generally toward the longitudinal axis of said bolster for a substantial portion of the distance between said positions to form spaced projections above said bolster top wall, with said reinforcing ribs extending above the area of the bolster top wall and being inside of and integral with said projections and said slanted walls to thereby reinforce said projections against excessive wedging force applied thereto above the area of said bolster top wall.

4,003,319

TUBULAR THROUGH SILL RAILWAY HOPPER CAR

George C. Campbell, Overland; James C. Hammonds, and Dallas W. Rollins, both of St. Charles, all of Mo., assignors to ACF Industries, Incorporated, New York, N.Y.

Division of Ser. No. 439,781, Feb. 5, 1974, Pat. No. 3,918,370. This application May 27, 1975, Ser. No. 581,100

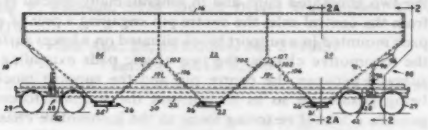
Int. Cl.² B61D *5/00, 7/00;* **B61F** *1/02, 1/10*

U.S. Cl. 105—248 **15 Claims**

1. A railway hopper car comprising:

spaced apart sides on opposite sides of said car joining longitudinally extending side sills and top chords; at least one transverse bulkhead joining said sides to define a plurality of hoppers in said car; said hoppers having converging slope sheets extending transversely of the car; the hoppers at opposite ends of the car having end slope

sheets; a through sill extending throughout the length of said car; said through sill comprising in cross section an enclosed tube of quadrilateral cross section including an apex extending upwardly into the hoppers to shed the lading; said through sill comprising at opposite end portions thereof end sections each having an end sill welded thereto; each of said end sections having affixed thereto a



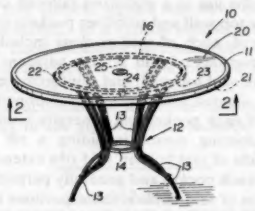
center plate and a bolster cover plate; said bolster cover plate extending transversely from said end section to each of said side sills and welded thereto; a vertical bolster web joining respectively each of said end sections to one of said end slope sheets; and hopper slope sheet reinforcing structure including generally triangular shaped members attached to said through sill, and attached and supporting said slope sheets.

4,003,320

TABLE ASSEMBLY

Douglas F. Owens, Altoona, and Thomas D. Aders, Birmingham, both of Ala., assignors to Champion International Corporation, Stamford, Conn.

Filed Dec. 18, 1975, Ser. No. 641,977
Int. Cl.² A47B *3/06*
U.S. Cl. 108—157 **7 Claims**



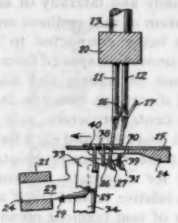
1. A table assembly comprising a top portion, base portion and means for securing said portions together; said bottom portion having a plurality of legs for supporting the table assembly and a circular ring mounted at the top of said plurality of legs, said circular ring having an inner radius measured from the center of said circular ring to the inner peripheral surface of said circular ring, and an outer radius measured from said center of said circular ring to the outer peripheral surface of said circular ring; said top portion having a bottom surface, a plurality of cross braces spaced equiangularly about the center of said bottom surface, and a plurality of clips, one clip being supported by one of said plurality of cross braces, whereby said top portion is assembled to said base portion by sliding the top portion along the circular ring until the clips are in flush engagement therewith, each of said clips including a vertical member extending perpendicular to its respective brace, and two horizontal members extending horizontally from said vertical member, each of said vertical members having an inner surface nearest said circular ring and an outer surface farthest from said circular ring; and one of said clips having an inner surface of its vertical member positioned on its respective cross brace a distance from the center of said bottom surface slightly less than said inner radius of said circular ring.

4,003,321

CUT PILE APPARATUS FOR STAGGERED NEEDLE TUFTING MACHINE

Roy T. Card, Chattanooga, Tenn., assignor to Card & Co., Inc., Chattanooga, Tenn.

Filed June 3, 1974, Ser. No. 475,625
Int. Cl.² D05C *15/12*
U.S. Cl. 112—79 R **6 Claims**



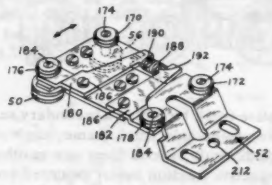
6. A looper assembly for a tufting machine comprising a looper bar, a plurality of loopers, each looper including a body portion and a loop penetrating and seizing bill angularly extending from said body portion and defining a throat therebetween, means for mounting said body portions in said looper bar in a row with all the throats substantially aligned, and the bills on alternate loopers being longer than the bills of the adjacent loopers.

4,003,322

AUTOMATIC SEWING MACHINE

Florian F. Yanikoski, Braintree, Mass., assignor to Union Special Corporation, Chicago, Ill.

Division of Ser. No. 496,749, Aug. 12, 1974, Pat. No. 3,970,016. This application Dec. 23, 1974, Ser. No. 535,874
The portion of the term of this patent subsequent to July 20, 1993, has been disclaimed.
Int. Cl.² D05B *21/00*
U.S. Cl. 112—121.12 **11 Claims**



1. Work piece holding means for an automatic sewing machine, comprising:

an elongated first arm pivotally connected adjacent one end to the sewing machine;

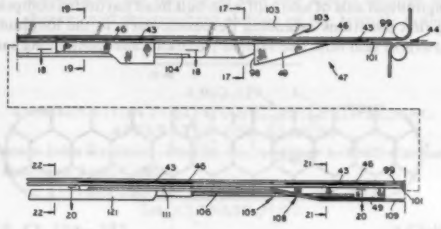
an elongated second arm carried on said first arm and being movable longitudinally with respect to the first arm, said second arm having a work holder adjacent one end for holding the work piece during sewing, said first and second arms having co-operating longitudinally extending flange means and a plurality of rollers said flange means defining a pair of opposed tracks adjacent opposed lateral sides of the arms, said rollers being received in said tracks with a first pair of rollers engaging against longitudinally spaced portions of one of said tracks while being spaced from the other of said tracks, and with a second pair of rollers engaging against longitudinally spaced portions of said other track while being spaced from said one track to provide stability and prevent binding of said arms during movement thereof; and

means for commonly biasing said rollers against opposite tracks.

4,003,323
APPARATUS FOR MANUFACTURING AND STACKING HEMMED FABRIC PIECES

Douglas J. Crawford, Troy; Roger LeMere, Petersberg, and Francis H. Hughes, Troy, all of N.Y., assignors to Cluett, Peabody & Co., Inc., New York, N.Y.

Division of Ser. No. 344,227, March 23, 1973, Pat. No. 3,898,941. This application Apr. 23, 1975, Ser. No. 570,808
Int. Cl.² D05B 35/02
U.S. Cl. 112—141 2 Claims



1. Apparatus for folding sequentially one side margin of a plurality of fabric pieces conveyed along a path defined by a continuously moving conveyor **99** engaging the upper surface of said fabric pieces to form a hem in each of said pieces, each said piece being positioned with said margin projecting to one side of said path; characterized by

a. a horizontal folder plate **101** for engaging the bottom surfaces of said sequentially fed fabric pieces, said folder plate having a folder plate edge **102** defining the first fold position of said hem;

b. a first vertical folder member **103** disposed spaced from and adjacent said folder plate edge, the edge **103**(a) of said first vertical folder member for engaging the advancing leading edge of each side margin of said fabric pieces to form between said folder plate edge and said first vertical folder member a margin flap **49**;

c. a second folder member **104** in said path downstream of said vertical folder member, said second folder member having a vertical portion **104**(b) and a horizontal portion **104**(a) for engaging the leading edge of said advancing margin flap **49** for folding said margin flap **49** toward the bottom surface of said folder plate **101**;

d. a first die plate **106** for engaging the upper surface of said folded advancing margin flap **49**;

e. a second die plate **107** spaced horizontally from said first die plate in said path for engaging the lower surface of said advancing margin flap **49**, said first **106** and second **107** die plates being disposed downstream of said second folder member in said path;

f. said first **106** and second **107** die plates being spaced vertically from each other to accommodate the thickness of said folded margin flap **49** when first engaging said margin flap;

g. the lower engaging surface **114** of said first die plate **106** extending continuously in a single horizontal plane;

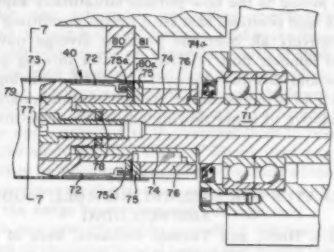
h. the upper engaging surfaces **113** of said second die plate **107** gradually inclined **108** along said path of travel from a first horizontal plane **109** below the plane of the engaging surface **114** of said first die plate **106** to a plane **111** above the engaging surface **114** of said first die plate **106** for folding the edge of said margin flap **49** inwardly of itself to form a second edge hem **51**; and

i. a shaped bar **121** for holding said folded hems in position under each fabric piece prior to sewing.

4,003,324
END TRIMMER

Oliver C. Tate, Darien, and Oliver J. Tysver, Flossmoor, both of Ill., assignors to The Continental Group, Inc., New York, N.Y.

Filed Feb. 4, 1976, Ser. No. 655,177
Int. Cl.² B21D 51/26
U.S. Cl. 113—7 R 4 Claims

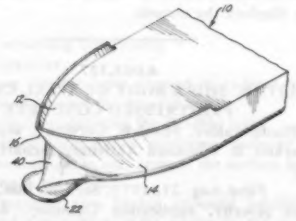


1. A can trimming machine including a stationary frame, a rotatable shaft, a spindle mounted on an end of said shaft for rotation about a longitudinal axis, a ring-shaped replaceable inner knife on said shaft coaxial with said spindle for rotation therewith, a replaceable stationary outer knife removably mounted on the frame in cooperative shearing relation with said inner knife to trim a can body to a predetermined length, said knives being sharpenable with attendant dimensional reduction axially of the shaft, said spindle and said frame having axially immovable counterfacing alignment surfaces thereon, means for reestablishing and maintaining said spindle in a predetermined axial relation to said shaft and said alignment surface on said frame subsequent to variation of the dimensions of said knives, and adjustable means for reestablishing and maintaining the cutting faces of said knives in abutting relation to said alignment surfaces, said spindle being attached to said shaft by a bolt or similar member and said spindle spacing means comprising a precisely dimensioned spacer fitting mounted on said member between said shaft and said spindle, said knife spacing means comprising a collar mounted on said shaft, said collar being axially adjustable relative to said shaft, and said inner knife is sleeveably mounted on said collar and movable with respect thereto.

4,003,325
CARGO VESSEL LOW RESISTANCE BOW

Rudolph A. Allen, 1419 Second West, No. 303, Seattle, Wash. 98119

Filed Mar. 24, 1975, Ser. No. 561,290
The portion of the term of this patent subsequent to Jan. 27, 1993, has been disclaimed.
Int. Cl.² B63B 1/00
U.S. Cl. 114—56 13 Claims



1. A vessel hull comprising, in combination with a bow portion thereof including forwardly convergent sides joined to

a bottom, a generally horizontally disposed wave-making plate, of a thickness a small fraction the height of the bow portion positioned generally coplanar with and forwardly of the hull bottom, said plate having a forward edge portion and aft thereof a portion of maximum transverse width several times its thickness and less than the width of the bow portion, behind which portion of maximum width the width of the plate extending aft decreases not less than by about one-fourth the maximum width at a location forwardly of the hull, and strut means joined to the bow portion structurally supporting said plate in said position, said strut means permitting water flowing relatively aft over the plate to diverge outwardly into parallel laminar flow relative to water flowing past the hull portion and downwardly over the width-reducing portion of the plate so as to pass under the hull bottom in parallel laminar flow relative to water flowing past the hull bottom directly.

4,003,326

APPARATUS FOR ASSEMBLING HULL MODULES FOR SHIPBUILDING

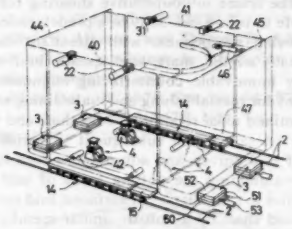
Hideharu Horii, and Tadashi Orimoto, both of Ichiharashi, Japan, assignors to Mitsui Shipbuilding and Engineering Co., Ltd., Tokyo, Japan

Filed Dec. 3, 1974, Ser. No. 529,072

Claims priority, application Japan, Dec. 5, 1973, 48-138332

Int. Cl.² B63B *3/00*

U.S. Cl. 114—65 R **2 Claims**



1. Apparatus for assembling hull modules for shipbuilding, including upright, longitudinal assemblies, an upright deck assembly and a bottom assembly, comprising opposed cars to support a pair or upright longitudinal assemblies respectively at their bottom portions, said each car having a chassis adapted to be moved in the vertical and horizontal directions, opposed supporting means to support upright deck assembly and bottom assembly respectively and operable to be moved in the vertical and horizontal directions to permit assembly thereof with said longitudinal assemblies, and means to grip upper portions of said longitudinal assemblies and operable to be retracted from the gripping position, each car chassis being supported by a plurality of vertical oil cylinders which are communicated with each other through a common valve which is opened to enable the chassis to float on the oil in the cylinders and to permit tilting of the chassis, and separate oil cylinders to adjust the longitudinal tilt of said chassis and to laterally displace the chassis.

4,003,327

MONOLITHIC SHIP'S BODY OF STEEL CONCRETE OR PRESTRESSED CONCRETE

Ulrich Finsterwalder, Munich, Germany, assignor to Firma Dyckerhoff & Widmann Aktiengesellschaft, Munich, Germany

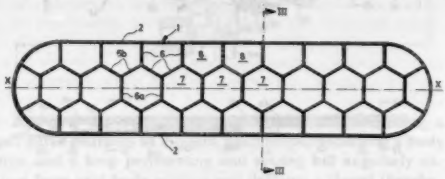
Filed Aug. 21, 1975, Ser. No. 606,483

Claims priority, application Germany, Aug. 29, 1974, 2441376

Int. Cl.² B63B *35/44*

U.S. Cl. 114—65 A **10 Claims**

1. A monolithic ship's body formed of concrete, said body comprising a hull including a bow, a stern, elongated side walls extending between the bow and stern and a bottom interconnecting said bow, stern and side walls, said hull having a longitudinal axis extending from said bow to said stern, a deck spaced above said bottom and interconnecting said bow, stern and side walls, said hull and deck forming an enclosed space, and bulkhead partitions positioned within the enclosed space extending upwardly from said bottom and in combination with said hull dividing the enclosed space into a number of compartments, wherein the improvement comprises that said bulkhead partitions are formed integrally with said hull, said bulkhead partitions are disposed in an hexagonal arrangement forming a grid symmetrically arranged with respect to the longitudinal axis of said hull, said bulkhead partitions comprising first partitions extending perpendicularly to the longitudinal axis of said hull, and second partitions interconnecting said



first partitions and extending generally in the direction of the longitudinal axis and disposed at oblique angles to the longitudinal axis, said bottom of said hull in section extending transversely to the longitudinal axis has an undulating curved configuration with the downwardly facing surface thereof having alternating convex and concave portions, said second partitions extending in at least two zig-zag lines between said bow and stern with the downwardly facing surface of said bottom opposite the base of each said zig-zag line at the junction thereof with said bottom having a concave configuration and said first partitions are disposed in at least three laterally spaced apart longitudinally extending rows, each said longitudinally extending row having a centerline disposed in parallel with the longitudinal axis of said hull and the downwardly facing surface of said bottom aligned below each centerline of said longitudinally extending rows having a convex surface.

4,003,328

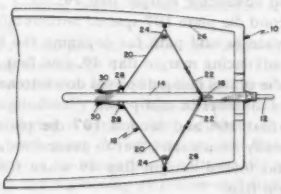
SELF-STEERING APPARATUS FOR SAILBOATS

Daniel P. Feldman, 3677 Baseside Lane, San Diego, Calif. 92109

Filed May 12, 1975, Ser. No. 576,852

Int. Cl.² B63H *25/00*

U.S. Cl. 114—144 R **7 Claims**



1. In a sailboat having, an elongated tiller bar connected to a rudder and pivoted at the aftermost end thereof and extending substantially forward therefrom, a self-steering mechanism comprising:

a. sheave means comprising a pair of sheaves mounted respectively on opposite sides of said sailboat in an area thereof generally laterally aligned with said tiller;

b. line means comprising a pair of length-adjustable lines each:

i. having an aft end attached to an aft portion of said tiller and

ii. passing forwardly through a respective one of said sheaves, and

iii. having a forward end attached to a forward portion of said tiller such that each of said line means together with the portion of the tiller between the points of attachment of said line means substantially define a triangle forward of the pivot point of said tiller;

c. one of said means being resilient to permit said tiller to move when said lines are taut whereby upon water pressure being exerted upon said rudder and said tiller responding thereto a resistance to tiller movement is achieved by the shifting of said line means through said sheaves and the resultant shifting of the triangle defined by said line means and said tiller.

4,003,329

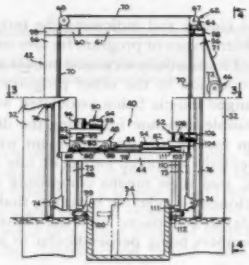
COMBINATION POSITIONING AND PROPELLING APPARATUS FOR BARGES

Horace John Robinson, Dublin, Pa., assignor to FMC Corporation, San Jose, Calif.

Filed July 26, 1973, Ser. No. 382,784

Int. Cl.² B63B *21/56*

U.S. Cl. 114—242 **3 Claims**



1. A combination positioning and propelling mechanism assembly for moving barges through a bulk material loading or unloading facility, the combination comprising:

a. a fixed supporting structure secured to piers on each side of a channel through which the barges pass, the structure having a pair of towers on each side of the channel extending vertically above the barge in the highest position of the barge, a pair of longitudinal beams connecting the top of the pair of towers on each longitudinal side of the channel and a pair of transverse beams spanning the channel and connecting the tops of oppositely positioned towers, the towers, the longitudinal beams and the transverse beams forming a single rigid rectangular supporting structure;

b. a liftable bridge spanning the channel and having a rectangular structural frame supported to move vertically within said fixed supporting structure and to be guided by fixed guide rails attached to the piers from a raised non-operating position above the barge to a lowered operating position;

c. a wire rope hoisting system including a drum shaft assembly having three drums on a common shaft rotatably supported on one longitudinal beam, a pair of spaced wire rope sheaves rotatably supported on the other longitudinal beam, a power driven drum type hoist unit mounted on one pier adjacent one of the towers, four wire rope cables, one end of each cable being secured to a corner of said liftable bridge, two of the cables passing vertically upward and over the sheaves then passing transversely to a first and second drum on the three drum shaft assembly, the other two cables passing vertically upward directly to the first and second drums, a fifth wire rope cable connected to a third drum of the three drum shaft assembly passes to the hoist unit, whereby operation of the hoist unit raises and lowers said bridge;

d. a wheeled carriage operating on a pair of horizontal longitudinally spaced rails mounted on one lateral end of said liftable bridge, said carriage movable transversely of the channel;

e. reciprocable power means mounted on said bridge and connected to said carriage providing linear motion to move said wheeled carriage on the horizontal rails of said bridge transversely of the channel;

f. at least one adjustable propelling mechanism unit mounted on said movable carriage, said propelling mechanism unit comprising an elongated vertical shaft rotatably supported from said carriage and extending below said bridge, a traction wheel mounted on the lower end of the vertical shaft and a first power means attached to said carriage and connected to the vertical shaft to reversibly rotate the shaft and the traction wheel, said propelling mechanism unit being adjustable transversely of the channel for positioning the traction wheel against the vertical side of the barge by moving said carriage; and

g. at least one non-adjustable propelling mechanism unit mounted on the other lateral end of said bridge from said adjustable propelling mechanism, said non-adjustable propelling mechanism comprising an elongated vertical shaft rotatably supported from and extending below said bridge, a traction wheel mounted on the lower end of the vertical shaft, and a second power means to reversibly rotate the shaft and the traction wheel, whereby when said bridge is lowered to bring the traction wheels in position vertically adjacent the upper portion of the barge, and said carriage is moved laterally to bring the traction wheel on said adjustable propelling mechanism unit into contact with the side of the barge, the barge is positioned between said fixed and adjustable propelling mechanism units and rotation of the traction wheels in their proper direction will propel the barge longitudinally in the channel.

4,003,330

MARINE ENGINE MOUNT

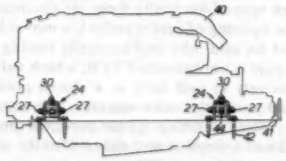
Jack Bernard Spencer Compton, Crawley, England, assignor to Silentbloc Limited, Crawley, England

Filed Oct. 2, 1975, Ser. No. 618,820

Claims priority, application United Kingdom, Oct. 3, 1974, 42962/74

Int. Cl.² B63H *21/30*

U.S. Cl. 115—.5 B **5 Claims**



1. A flexible mounting comprising:

a rigid inner member,

an intermediate flexible layer formed in at least one part and positioned around the inner member,

an outer member surrounding the flexible layer,

a support member which has mounting surfaces which, when the mounting is in use, contact the surface to which the mounting is mounted,

the support member also having opposed parallel walls which extend generally at right angles to the mounting surfaces of the support member, and between which the outer member is located,

and clamping means for clamping the outer member to the

support member at any selected one of various positions which are spaced apart along the parallel walls in the direction at right angles to the mounting surfaces of the support member,

the rigid inner member having a bore which extends generally parallel to the parallel walls and to the mounting surfaces, for receiving a member which is to be supported while allowing rotational adjustment of the member within the bore.

4,003,331

EXHAUST VALVE ASSEMBLY FOR PREVENTING INGRESS OF WATER TO AN OUTBOARD MARINE ENGINE

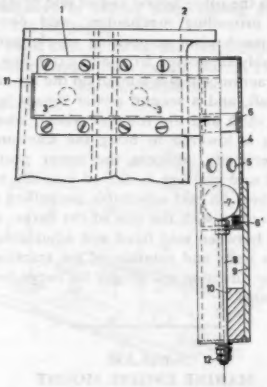
Michael Brian Jervis Brinton, East Cowes, England, assignor to R. N. L. I. (Trading) Limited, England

Filed July 30, 1975, Ser. No. 600,304

Claims priority, application United Kingdom, Aug. 1, 1974, 34031/74

Int. Cl.² B63H *21/32, 21/26*

U.S. Cl. 115—17 **6 Claims**



1. An automatic valve assembly for preventing ingress of water to a gas-flow housing of an outboard marine engine in the event of a capsize, comprising a gas manifold for attachment to said housing and having a gas-flow opening, a gas-flow tube secured to said manifold at the location of said gas-flow opening and having its interior communicating with said gas-flow opening, said gas-flow tube being oriented approximately vertically and having at least one gas-flow port in its tube wall at a location spaced vertically from its communication with said gas-flow opening of said manifold, a movable valve member mounted on said tube and normally resting in a position where said port is unobstructed by it, which valve member is slidable relatively to said tube to a closed position where it obstructs said port if the valve assembly is inverted, and gravity-actuated valve-operating means mounted on said tube to operate said valve member and slide it into the closed position upon inversion of the assembly.

4,003,332

INFORMATION DISPLAY DEVICE

Arthur Berge, Kilian Zollsgatan 5, 217 56 Malmo, Sweden

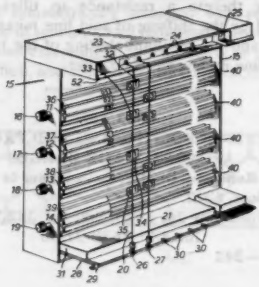
Filed June 25, 1975, Ser. No. 590,131

Claims priority, application Sweden, Dec. 16, 1974, 7415297

Int. Cl.² G09F *11/02*

U.S. Cl. 116—131 **3 Claims**

1. A device for displaying a program and its progress, the program being constituted by respective program factors of at least three groups of different types, of which at least two are distributed on at least two rolls, one of said groups of program factors being common to all the other program factors, said device comprising a plurality of indicator support rolls with axes spaced apart and parallel to each other and lying in the same plane, means for mounting said rolls for selective rotation with respect to one another about their axes, scale means outside the rolls and disposed parallel to the common plane of the axes of the rolls, each of said rolls having a plurality of tracks structurally integral with the rolls and extending parallel to the axes of the rolls, indicator means slidably mounted on the tracks, each of the indicator means having thereon a visible indicium the visible indicium indicating the different



types of program factors and indicating the interrelationship between the different types of program factors on each of said rolls, one group of sequentially arranged indicia indicating the program factor common to the other program factors, said sequentially arranged indicia being associated with said scale means and the visible indicium indicating the different types of other program factors being in alignment with respective ones of the sequentially arranged indicia on one of the indicator support rolls, said scale means comprising a plurality of spaced parallel elongated indexing members that lie in a common plane parallel to but spaced from the plane of said axes, said indexing members being perpendicular to said axes.

4,003,333

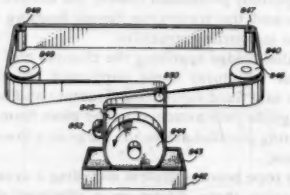
DEVELOPMENT SYSTEM

Roger H. Eichorn, deceased, late of Webster, N.Y., by Lincoln First Bank of Rochester, executor, Rochester, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 18, 1975, Ser. No. 569,337

Int. Cl.² G03G *13/08*

U.S. Cl. 118—653 **1 Claim**



1. Apparatus for transporting particulate development material from a container to a remote location comprising:

a. a rotatable electrically grounded drum member adapted to be at least partially submerged in the particulate material in the container;

b. means to rotate said drum member;

c. an electrically insulating belt member in the form of a moebius strip wrapped partially around said drum member, said belt member comprising:

a layer of electrically conductive material on the drum member contacting side of said belt member;

a layer of electrically insulating material contacting one surface of the layer of electrically conductive material;

an electrically continuous screen pattern of electrically conductive material contacting the free surface of said layer of electrically insulating material;

d. rotatable guide means supporting the remainder of said belt member in a plane substantially parallel to the axis of said drum member, whereby one surface of said belt member never contacts said drum member or said guide means; and

e. charging means adjacent said drum member for placing a substantially uniform electrostatic charge upon said belt member.

4,003,334

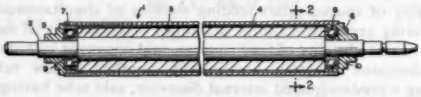
DEVELOPER ROLLER FOR ELECTROSTATIC COPIER

Abe Samuels, Chicago, and Roger Wiggerman, McHenry, both of Ill., assignors to Speed-O-Print Business Machines Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 630,790, Nov. 11, 1975. This application Dec. 22, 1975, Ser. No. 643,012

Int. Cl.² G03G *15/09*

U.S. Cl. 118—658 **10 Claims**



1. In an electrostatic photocopy machine, wherein a single component magnetic toner material is collected on the surface of a developer roller from a source of said material and transferred to electrically charged image areas on the surface of a copy sheet moving in a plane adjacent thereto, an improved developer roller construction which comprises a shaft mounted for rotation, an axially extending magnetic core surrounding said shaft and divided into axially extending segments, wherein adjacent segments have opposite polarity, and producing a uniform magnetic field, and an outer shell surrounding said magnetic core in spacial relation thereto, said shell and core being rotatable relative to each other thereby to collect uniformly the single component toner material on the surface of said shell during rotation of one of said shell or core, said shell being electrically non-conductive, thereby to resist attack by chemicals in said toner which tend to create imperfections in the surface of said shell which cause poor reproduction of copies.

4,003,335

DEVELOPING MATERIAL APPLICATOR

Takaji Kurita, Kawachinagano, and Takao Fujiwara, Sakai, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 28, 1975, Ser. No. 572,292

Claims priority, application Japan, May 21, 1974, 49-57540

Int. Cl.² G03G *15/09*

U.S. Cl. 118—658 **7 Claims**

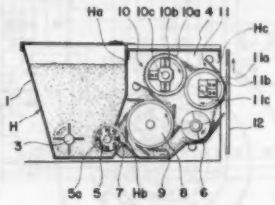
1. An apparatus for use in a photo-electrostatic copying machine for delivering toner particles carried by magnetizable carrier beads to develop an electrostatic latent image formed on an image-receiving surface, said apparatus comprising:

first compartment means within said copying machine for containing therein only said toner particles;

second compartment means adjacent said first compartment means for containing a mixture of said toner particles and said carrier beads therein, said compartment having a first opening into said first compartment means and a second opening adjacent said image receiving surface;

applicator means within said second compartment means adjacent said second opening for developing the electrostatic latent image formed on said image receiving surface; and

a rotatable replenishing means between said first opening and said applicator means for removing said toner particles from said first compartment means and contacting



said toner particles with said carrier beads contained in said second compartment means, for delivering said toner particles and carrier beads to said applicator means, and for recirculating said carrier beads within said second compartment means to said toner particles coming from said first compartment means after said toner particles and carrier beads are delivered to said applicator means.

4,003,336

DEVICE FOR THE MAGNETIC ORIENTATION OF MAGNETIC RECORDING MEDIA

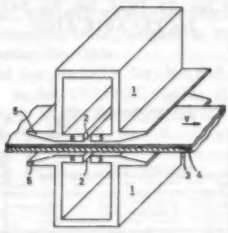
Eberhard Koester, Frankenthal; Paul Deigner, Weisenheim; Roland Falk, Achern; Karl Uhl, Frankenthal, and Dieter Schaefer, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Aug. 13, 1975, Ser. No. 604,129

Claims priority, application Germany, Aug. 27, 1974, 2440920

Int. Cl.² B05C *11/00*

U.S. Cl. 118—640 **2 Claims**



1. A device for magnetically orienting anisotropic magnetic particles in magnetic recording media consisting of a non-magnetic base and a magnetic coating containing the said particles dispersed in a solidified non-magnetic organic binder, the base carrying the fluid dispersion of the said particles in the said binder being passed through a magnetic field, such device comprising:

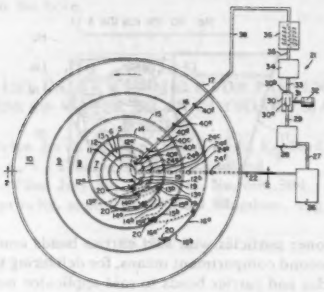
two magnetic circuits having one air gap each, the air gaps of both circuits being parallel to and opposite each other and being arranged in parallel planes on either side of said base and symmetrically with respect to the plane of the magnetic coating, the direction of the lines of magnetic force in the air gaps of both circuits running in the same direction as the direction of motion of the base and parallel thereto, the edges of said magnetic circuits adjacent to the base carrying the fluid dispersion being provided with screening elements whose distance from each other increases as the screening elements extend away from the edges of the magnetic circuits.

4,003,337

FISH GROWING TANK AND METHOD

Kerry Lamar Moore, 2215 Ann, Monroe, La. 71201

Filed Oct. 23, 1974, Ser. No. 517,033
Int. Cl.² A01K 61/00
U.S. Cl. 119—3 2 Claims



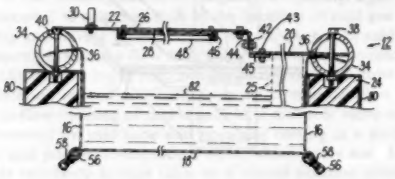
1. Apparatus for raising aquatic life forms comprising: a tank; a plurality of concentric tank walls of progressively larger radius in said tank forming annular compartments of increasing volume, said tank walls inwardly of the outer wall, each having an opening formed therein to allow movement of aquatic life forms between the compartments; a plurality of doors; means pivotally securing a door over each of said openings; said means arranged such that each door pivots inwardly of each compartment to form a transverse barrier between adjacent tank walls.

4,003,338

AQUATIC ANIMAL CAGE AND FABRICATION METHOD

Gregor N. Neff, Dobbs Ferry, N.Y., and Paul C. Barrett, Homestead, Fla., assignors to Gregor N. Neff, Dobbs Ferry, N.Y.

Filed Jan. 29, 1975, Ser. No. 545,149
Int. Cl.² A01K 63/00
U.S. Cl. 119—3 20 Claims



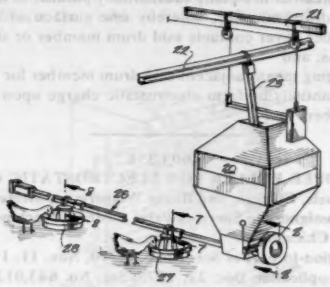
1. A cage for aquatic animals, said cage comprising an upper peripheral frame including an elongated netting support member having a re-entrant cross-sectional shape and a longitudinally extending gap formed therein, said gap opening towards the interior of said frame, netting material forming a basket depending from said frame, said netting material having upper edges and said upper edges extending laterally outwardly of the remainder of the netting material into said gap with said remainder of the netting material extending downwardly from said upper edges and gap at substantially right angles to the plane of the gap, clamping means extending through said support member and said upper edges of said netting material generally transversely of the plane of said gap for clamping the edges of the support member at said gap upon, and holding, said upper edges of said netting, and floatation means secured to said upper frame to float said cage upon a body of water with said basket immersed in the water.

4,003,339

METHOD AND APPARATUS FOR DELIVERING LARGE QUANTITIES OF FEED AND THE LIKE

Eldon Hostetler, Middlebury, Ind., assignor to Chore-Time Equipment, Inc., Milford, Ind.

Filed Nov. 6, 1972, Ser. No. 303,977
Int. Cl.² A01K 5/02
U.S. Cl. 119—52 AF 2 Claims



1. A poultry feeder comprising a high capacity conveyor extending from a source of supply of mixed poultry feed to a plurality of spaced apart feeding stations of simultaneously delivering generally uniform quantities and mixtures of said feed to said plurality of feed stations, said conveyor including an elongated generally horizontally disposed hollow tube having a predetermined internal diameter, said tube having a plurality of spaced outlet holes disposed in a helical array therealong and respectively associated with successive feeding stations, said holes being arranged so that the helical array starts adjacent said source of feed supply and at one side of the tube as viewed from an end of the conveyor remote from said source of supply and finishes generally at the bottom of the tube, all of said holes between the start and the finish of said array being substantially at said one side of the tube and means for imparting to the feed mixture a generally helical rolling and mixing motion extending generally circumferentially in a direction extending from said one tube side toward the bottom around and longitudinally of the tube and thereby substantially simultaneously projecting generally uniform quantities of the feed through all of the outlet holes, said means comprising an extended pitch centerless auger rotatably disposed in said tube and having a diameter substantially the same as said internal diameter, and drive means connected with the auger for rotating the auger at a speed for obtaining said rolling and mixing motion of the feed, said tube having a nominal diameter of about one and one-half inches, said centerless auger having a nominal pitch of about two and one quarter inches, and said drive means having an output driving said auger at about 354 r.p.m.

4,003,340

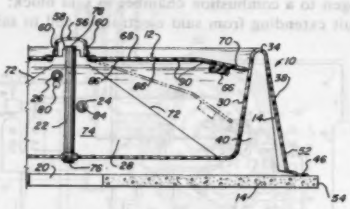
STOCK WATERING TROUGH AND STEPPED BASE THEREFOR

James H. Kuzara; Norman L. Feck, and Vincent P. Johnston, all of Sheridan, Wyo., assignors to J-K Mfg. Co., Inc., Sheridan, Wyo.

Filed Mar. 31, 1975, Ser. No. 558,971
Int. Cl.² A01K 7/00
U.S. Cl. 119—73 7 Claims

1. A stock watering trough comprising: upstanding side and end walls cooperating with one another and with a bottom wall to define an open-topped reservoir; lid-supporting means bridging the side walls intermediate the end walls; means for filling and for draining said reservoir located therein beneath the lid-supporting means; lid-forming means hingedly attached to said lid-supporting means for tiltable movement

between a closed horizontally-disposed position covering the open top of said reservoir and an open position depressed down into the latter, said lid-forming means in open position cooperating with said side and bottom walls to define a barrier



effective to deny a drinking animal access to said means for filling and draining said reservoir; and, submersible float means fastened to the underside of said lid-forming means effective to normally maintain the latter in closed position when said reservoir is full.

4,003,341

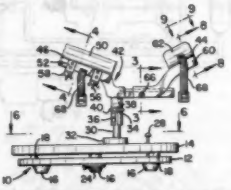
GROOMING STAND FOR PETS

Francis A. La Croix, 436 Pearl St., Marine City, Mich. 48039

Filed July 3, 1975, Ser. No. 593,033

Int. Cl.² A61D *3/00*

U.S. Cl. 119—103 **2 Claims**



1. A grooming stand for pets comprising a stationary base, a series of balls rollably mounted in the upper side of the stationary base, a table rotatably supported on the balls, an annular array of openings in the upper side of the stationary base, a spring loaded locking pin in the rotatable table for selective engagement in the annular array of openings in the stationary base, a vertically adjustable upright support on the rotatable table, and a cradle on the upright support for holdably receiving a pet.

4,003,342

AUTOMATIC CONTROL SYSTEM

Stanley Cyril Hodgson, London, England, assignor to Tank Sapp (UK) Ltd., London, England

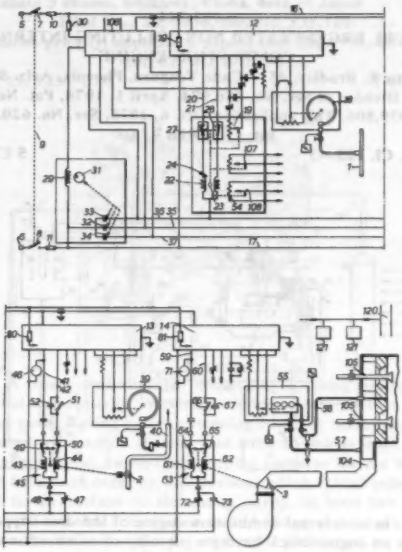
Filed Mar. 27, 1975, Ser. No. 562,990

Claims priority, application United Kingdom, Mar. 29, 1974, 14091/74

Int. Cl.² F23N *3/00*

U.S. Cl. 122—448 R **13 Claims**

1. An automatic control system for controlling a first variable quantity which depends on second and third variable quantities, including means for setting a set value of the first quantity, means for measuring the actual value of the first quantity, a comparator for comparing the actual value of the first quantity with the set value, means for setting a set value of the second quantity, means for measuring the actual value of the second quantity, means for setting a set value of the third quantity, means for measuring the actual value of the third quantity, individual controls for each of the second and third quantities for adjusting them to accord with the respective differences between their actual values and their set values, and a control responsive to a difference between the set and actual value of the first quantity for modifying the set values of the second and third quantities, which responsive



control includes a timer motor, and respective on/off switch means between the timer motor and each of the setting means for the second and third quantities.

4,003,343

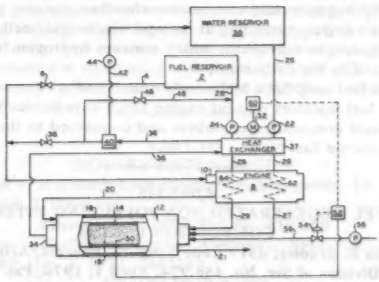
METHOD AND APPARATUS FOR MAINTAINING THE OPERATING TEMPERATURE IN A DEVICE FOR REDUCING ENGINE EXHAUST POLLUTANTS

Roy C. Lee, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 4, 1975, Ser. No. 565,088

Int. Cl.² F02C *43/08*

U.S. Cl. 123—3 **8 Claims**



1. In a method for operating an engine with reduced pollutants in the exhaust of said engine in which water and a liquid hydrocarbon fuel for an engine are passed through a catalytic bed, increasing the temperature of the material in contact with the catalytic bed by indirect heat exchange with the exhaust from the engine, steam reforming the fuel, and thereafter passing the reformed fuel to the engine for operating the engine the improvement of

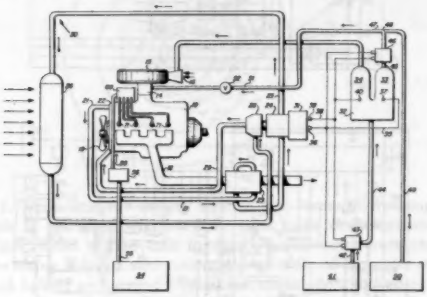
1. passing water and liquid hydrocarbon fuel in indirect heat exchange with the block of the operating engine and then
2. passing said water and hydrocarbon fuel through said catalytic bed.

4,003,344

FUEL REGENERATED NON-POLLUTING INTERNAL COMBUSTION ENGINE

Curtis E. Bradley, 4517 Calle Vengura, Phoenix, Ariz. 85018

Division of Ser. No. 456,974, April 1, 1974, Pat. No. 3,939,806. This application Oct. 6, 1975, Ser. No. 620,022
Int. Cl.² F02B *43/08*
U.S. Cl. 123—3 **5 Claims**



1. In an internal combustion engine of the diesel type,
a. an engine block having a plurality of combustion chambers;
b. an exhaust pipe extending from said block;
c. a closed system for a working fluid including a pump for circulating the working fluid through the system, a turbine which is operated by the working fluid when in a gaseous state and a condenser for returning the working fluid from a gaseous state to a liquid;
d. a heat exchanger disposed about said exhaust pipe and through which said closed system passes to derive heat from the exhaust pipe and heat the working fluid;
e. a generator driven by said turbine to produce a DC electric current;
f. an electrolysis cell containing water and connected to said generator so that the DC current therefrom decomposes the water into oxygen and hydrogen;
g. a water tank for supplying water to said electrolysis cell;
h. a hydrogen carburetor on said engine block for delivering hydrogen to said combustion chambers;
i. a conduit extending from said electrolysis cell to said hydrogen carburetor which conveys hydrogen from the cell to the carburetor;
j. a fuel tank for a hydrocarbon fuel, and
k. fuel injectors on said engine block communicating with said combustion chambers and connected to the hydrocarbon fuel tank.

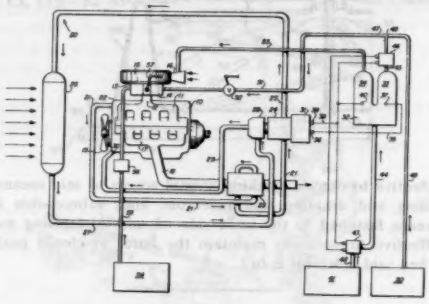
4,003,345

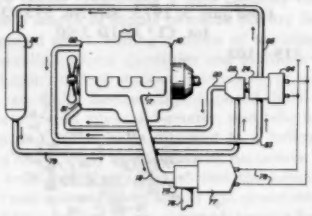
FUEL REGENERATED NON-POLLUTING INTERNAL COMBUSTION ENGINE

Curtis E. Bradley, 4517 Calle Vengura, Phoenix, Ariz. 85018

Division of Ser. No. 456,974, April 1, 1974, Pat. No. 3,939,806. This application Oct. 6, 1975, Ser. No. 620,023
Int. Cl.² F02B *43/08*
U.S. Cl. 123—3 **2 Claims**

1. In an internal combustion engine,
a. an engine block;
b. an exhaust pipe extending from said block;
c. a turbo-generator comprising a turbine communicating with said exhaust pipe to be powered by exhaust gases emanating from said exhaust pipe and a generator driven by said turbine and producing a DC current;
d. an electrolysis cell containing water and connected to said generator so that the DC current therefrom decomposes the water into oxygen and hydrogen;
e. a water tank for supplying water to said electrolysis cell;
f. a hydrogen carburetor on a engine block for delivering hydrogen to a combustion chamber in said block;
g. conduit extending from said electrolysis cell to said hydrogen carburetor which conveys hydrogen from the cell to the carburetor;





h. a hydrocarbon fuel carburetor on said engine block and connected to said hydrocarbon fuel tank, and
i. linkage connected to said carburetors and operable to vary the ratio of hydrogen and hydrocarbon fuel which is introduced into the combustion chamber of said engine block.

4,003,346

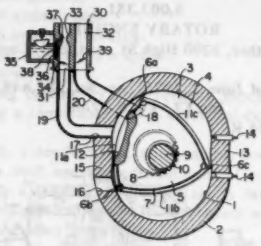
ROTARY PISTON INTERNAL COMBUSTION ENGINE

Toshiyuki Kohno, Toyoake, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Oct. 15, 1974, Ser. No. 514,906
Claims priority, application Japan, June 24, 1974, 49-71426; July 11, 1974, 49-78721
Int. Cl.² F02B *53/04*
U.S. Cl. 123—8.13 **6 Claims**

1. A rotary engine comprising, in combination, a rotor housing defining interiorly thereof a rotor chamber enclosed by a trochoidally shaped peripheral wall and a pair of side walls, a rotor mounted for rotation in a given direction within said rotor chamber, said peripheral wall including a pair of short-axis portions each having a leading end taken in a direction forwardly of rotor rotation, a peripheral port extending through one of said short-axis portions at the leading end thereof and opening into said rotor chamber through said peripheral wall, a side port opening into said rotor chamber through one of said side walls, said rotor operating to open and close said side port and said peripheral port during rotation thereof, said side port being located proximate said peripheral port forwardly thereof taken in the direction of rotor rotation with said side port being arranged relative to said

peripheral port to remain open for a period of time after closing of said peripheral port during rotation of said rotor,



means for delivering a fuel mixture into said rotor chamber through said peripheral port and means for delivering air into said rotor chamber through said side port.

4,003,347

ROTARY PISTON ENGINE

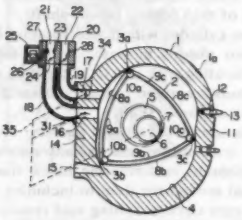
Yoshio Sasaki, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Feb. 28, 1975, Ser. No. 554,106

Claims priority, application Japan, Sept. 26, 1974, 49-109985

Int. Cl.² F02B *53/06*

U.S. Cl. 123—8.13 **7 Claims**



1. A rotary engine comprising a rotor housing defining interiorly thereof a rotor chamber bounded by a trochoidally-shaped inner peripheral wall of said housing, a rotor mounted for rotation in a given direction within said rotor chamber, said inner peripheral wall including a pair of minor axis portions and defining together with said rotor a plurality of combustion chambers therebetween, a first port and a second port both opening into said rotor chamber through one of said minor axis portions closely adjacent each other but spaced apart in the direction of rotor rotation, said second port being located forwardly of said first port relative to said given direction of rotor rotation, means for delivering a first flowing fluid consisting of a rich fuel mixture into said rotor chamber through said first port, means for delivering into said rotor chamber through said second port a second flowing fluid which is leaner than said first fluid, first valve means arranged to open and close fluid flow through said first port, second valve means arranged to open and close fluid flow through said second port, and means for controlling operation of said first and said second valve means to effect delivery into said combustion chambers of said first and second fluids in relationship to the rotation of said rotor to introduce said first fluid into a leading end portion of each of said combustion chambers taken relative to the direction of rotation of said rotor and to introduce said second fluid into a trailing end portion of each of said combustion chambers.

4,003,348

ROTARY INTERNAL COMBUSTION ENGINE

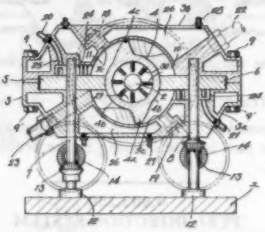
Yukimasa Suzuki, 357, Kawawa-cho, Hamamatsu, Shizuoka, and Rikuro Arai, Room No. 3, Kojimaso, 20-8, Minami-Yahata 3 chome, Ichikawa, Chiba, both of Japan

Filed Dec. 23, 1974, Ser. No. 535,712

Claims priority, application Japan, Dec. 28, 1973, 49-4105

Int. Cl.² F02B *53/00*

U.S. Cl. 123—8.31 **7 Claims**



1. A rotary motor device comprising a casing having an internal substantially cylindrical cavity, a rotor within said casing cavity having a shaft extending coaxially therewith and mounted for rotation therein, said rotor having at least two, similarly formed, twisted and sloping recesses therein separated from each other by wall portions which extend substantially to the surface of the casing cavity, at least two disc members mounted for rotation in said casing about axes normal to the axis of said rotor and each positioned so as to project partially into the casing cavity at annularly spaced areas thereof, the peripheries of said disc members being largely circular but cut away at one side to provide a propeller-like twisted and sloped face whereby to enter and leave the ends of the twisted and sloping recesses of said rotor as the rotor and disc members are simultaneously rotated at predetermined synchronized speeds, means for synchronizing the rotation of said disc members with the rotation of said rotor, each of said disk members having a shaft for rotatably supporting the same, said shafts extending normal to the axis of rotation of the rotor shaft, said casing including at least one fuel-feeding passage for feeding fuel to the rotor recesses, said passage being situated adjacent one of the disk members and including a duct extending from outside the casing past the shaft of its nearest disk member and opening into the cavity of said casing, valve means on the shaft of said nearest disk member for rotation therewith and extending into the gas-feeding passage, said valve means being constructed for connecting and disconnecting the duct to the opening into the casing cavity upon rotation of said shaft, at least one ignition plug mounted in said casing with the end thereof adjacent to, but recessed from the periphery of the cylindrical cavity.

4,003,349

ROTARY PISTON ENGINE

Leopold v. Habsburg-Lothringen, Gabelsbergerstr. 15, 8000 Munich 2, Germany

Filed Sept. 4, 1975, Ser. No. 610,300

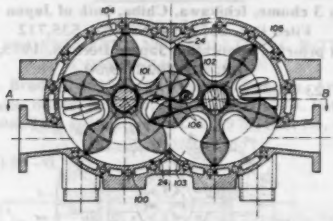
Claims priority, application Germany, Sept. 18, 1974, 2444482; Oct. 3, 1974, 2447249

Int. Cl.² F02B *53/00*

U.S. Cl. 123—8.47 **10 Claims**

1. In a rotary piston engine of the type including a housing defining a pair of parallel, intersecting cylinders and having a precompression region in the vicinity of said intersecting cylinders, and a pair of rotors affixed to parallel shafts extending coaxially in said cylinders, each rotor having a plurality of cycloidal lobes, the rotors being positioned, so that their lobes intermesh to form chambers of variable volume operating as compression and expansion zones; the improvement comprising pressure compensation recesses in the cylinder walls in the

regions of the intersection of the intersecting cylinders, said pressure compensating recesses being arranged to be effective



in said compression zone and in said expansion zone, and a fuel injection port in said housing in the precompression region thereof.

4,003,350

FUEL INJECTION SYSTEM

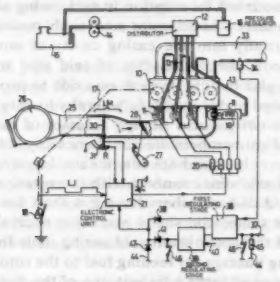
Hermann Eisele, Vaihingen; Otto Glöckler, Renningen, and Rudolf Schwammle, Korntal, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Sept. 18, 1975, Ser. No. 614,768

Claims priority, application Germany, Oct. 10, 1974, 2448306

Int. Cl.² F02B *3/00*

U.S. Cl. 123—32 EA **7 Claims**



1. In a fuel injection system for an internal combustion engine having integral action regulation for influencing the fuel-air mixture supplied to the engine, and an oxygen sensor disposed in the exhaust gas flow from the engine and producing an output voltage indicative of the oxygen content of the exhaust gas, the improvement comprising:

a. a first regulating stage to which a nominal voltage is applied, said first regulating stage being connected to the oxygen sensor for receiving the output voltage of the oxygen sensor, and for producing an output voltage which is a function of both the nominal voltage and the output voltage of the oxygen sensor;

b. a second regulating stage to which a nominal voltage is applied, said second regulating stage being connected to the first regulating stage for receiving the output voltage of the first regulating stage, and for producing an output voltage which is a function of both the nominal voltage applied to the second regulating stage and the output voltage of the first regulating stage;

c. means for superimposing the output voltages of the first and second regulating stages;

d. an electronic control unit connected to the means for superimposing the output voltages of the first and second regulating stages for receiving the superimposed voltages as an input; and

e. adjustable means connected to the electronic control unit for receiving the output voltage from the electronic control unit and varying thereby the fuel quantity injected and consequently the fuel-air mixture, wherein the regulating range and regulating time constant of the first regulating stage is lower than the regulating range and regulating time constant of the second regulating stage.

4,003,351

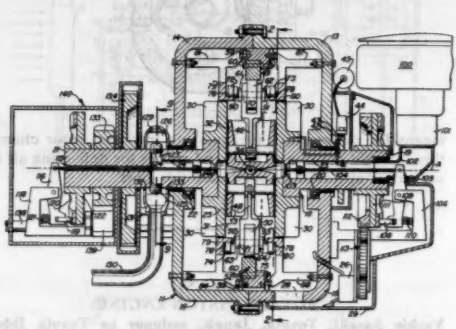
ROTARY ENGINE

William E. Gunther, 2200 High St., Apt. 868, Cuyahoga Falls, Ohio 44221

Filed June 2, 1975, Ser. No. 582,648

Int. Cl.² F02B *57/00*

U.S. Cl. 123—44 R **14 Claims**



1. A rotary engine comprising:

a housing;

a central power shaft establishing an axis through said housing and having first and second sections, each of said sections rotatably mounted in said housing;

a rotating block connected between said first and second sections of said central power shaft;

at least one cylinder within said rotating block;

at least two pistons mounted within said rotating block communicating with said cylinder such that upon ignition said pistons are urged radially outwardly from the axis of said central power shaft;

piston rods connected to said pistons;

means for transmitting the radially outward movement of said pistons to said rotating block thereby imparting a rotational movement thereto including;

a cycle cam circumscribing said rotating block;

cycle cam followers carried by said piston rods and engaging said cycle cam;

actuator arms connecting said cam followers to said rotating block;

at least one retention cam mounted within said housing and concentric with said power shaft;

a retention cam follower for each said piston;

a lever arm connecting said retention cam follower to said rotating block;

means for biasing said lever arm with respect to said actuator arm whereby said cycle cam follower is maintained against said cycle cam at all times;

a fuel intake system;

an exhaust system; and,

an ignition system.

13. A rotary engine comprising:

a housing;

a central power shaft establishing an axis through said housing and having first and second sections, each of said sections rotatably mounted in said housing;

a rotating block connected between said first and second sections of said central power shaft;

at least one cylinder within said rotating block;

at least two pistons mounted within said rotating block communicating with said cylinder such that upon ignition said pistons are urged radially outward from the axis of said central power shaft;

piston rods connected to said pistons;

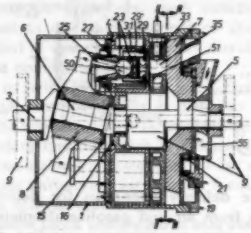
means for transmitting the radially outward movement of said pistons to said rotating block thereby imparting a rotational movement thereto;
a fuel intake system;
an exhaust system; and,
an ignition system including:
means for generating a spark;
an ignition plug;
a housing carried by said rotating block for said plug having a removable cap in electrical contact with said plug;
a radially extending disc nonrotatably mounted on said power shaft and in electrical contact with said plug;
a radially extending disc nonrotatably mounted on said power shaft and in electrical contact with said means for generating a spark; and,
an insulated ignition conductor means carried by said power shaft in electrical contact with said radially extending disc and said cap for transmitting a spark from said means for generating to said ignition plug.

4,003,352

LONGITUDINAL-STROKE INTERNAL COMBUSTION ENGINES

Nikolaj Wladimir Rogojew, Schoenburgstr. 42/6, 1040 Vienna, Austria

Filed Dec. 5, 1974, Ser. No. 529,828
Claims priority, application Austria, Dec. 12, 1973, 10160/73
Int. Cl.² F02B *57/04*
U.S. Cl. 123—58 B **18 Claims**



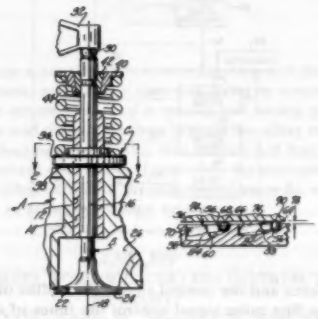
1. In an internal combustion engine having a housing with which externally accessible suction and exhaust ports are associated, a crankshaft supported in the housing for rotation about a first axis, a cylinder block having an odd number of cylinders distributed around the first axis, the cylinders respectively containing pistons reciprocable along a second axis parallel to the first axis, means connected to the crankshaft for operating the pistons, means carried by the crankshaft for successively effecting communication between the suction and exhaust ports and successive ones of the cylinders, the communication effecting means comprising, in combination, a first apertured member having a plurality of gas exchange channels therethrough corresponding to and in fixed communication with the respective cylinders in the cylinder block, each gas exchange channel terminating at a planar first face of the first apertured member remote from the cylinder block, a second apertured member having a planar second face parallel to and engageable with the first face of the first apertured member, the second apertured member having a plurality of suction and exhaust channels for providing communication between the second face and the suction and exhaust ports, means for supporting one of the first and second apertured members about the first axis, means supporting the other one of the first and second apertured members for rotation about a third axis parallel to the first axis, and gear means cooperatively disposed on the housing and on said other apertured member for orbiting said other apertured member about the first axis as it rotates about the third axis, the improvement in which both the suction and exhaust ports terminate in at least one plane parallel to and spaced from the second face, and in which the second apertured member comprises at least one third planar face parallel to and engageable with the terminating plane of the suction and exhaust ports, each third face being parallel to and axially spaced from the second face, the suction and exhaust channels extending through the second apertured member between the respective second and third faces thereof.

4,003,353

VALVE ROTATOR

Max J. Tauschek, South Euclid, Ohio, assignor to TRW Inc., Cleveland, Ohio

Filed Apr. 23, 1975, Ser. No. 570,637
Int. Cl.² F01L *1/26*
U.S. Cl. 123—90.23 **20 Claims**



1. A mechanism for converting axial motion of an elongated stem in a guide member into rotational motion of the stem comprising; first and second parts mounted coaxially on said stem for movement toward and away from one another in axial directions along a longitudinal axis and for rotational movement relative to one another about said axis in opposite rotational directions, said stem being rotatable in response to rotation of one of said parts and the other of said parts being fixed against axial and rotational movement relative to said longitudinal axis, rotation imparting means positioned between said parts for imparting a predetermined angular degree of relative rotation to said parts in one of said rotational directions in response to axial movement therebetween in one of said axial directions and for imparting a different angular degree of relative rotation to said parts in the other of said rotational directions in response to axial movement therebetween in the other of said axial directions.

4,003,354

MEANS AND METHOD FOR CONTROLLING THE OCCURRENCE AND THE DURATION OF TIME INTERVALS DURING WHICH SPARKS ARE PROVIDED IN A MULTICYLINDER INTERNAL COMBUSTION ENGINE

Robert E. Canup, Chester, Va., assignor to Texaco Inc., New York, N.Y.

Filed Dec. 19, 1974, Ser. No. 534,254
Int. Cl.² F02P *5/08*
U.S. Cl. 123—117 R **9 Claims**

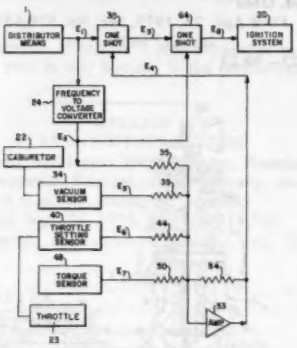
1. In a multicylinder internal combustion engine having a crankshaft, a system for controlling the occurrence and duration of time intervals during which sparks are provided in said engine, comprising
pulse source means for providing pulses having a repetition rate corresponding to the rotational speed of the crank shaft being driven by the internal combustion engine,
frequency-to-voltage converter means connected to the

pulse source means for providing a voltage whose amplitude corresponds to the repetition rate of the pulses from the pulse source means,

a plurality of sensing means for sensing different operating parameters associated with the internal combustion engine,

control signal means connected to all the sensing means and to the converter means for providing a control signal in accordance with the signals from the sensing means and the voltage from the converter means,

first pulse signal means connected to the distributor means and to the control signal means for providing a first pulse signal in accordance with the pulses from the distributor



means and the control signal, the widths of the pulses in the first pulse signal control the times of occurrence of the spark time intervals,

second pulse signal means connected to the first pulse signal means and to the converter means for providing a second pulse signal in accordance with the first pulse signal and the widths of the pulses in the second pulse signal control the durations of the spark time intervals, and the voltages from the converter means, and

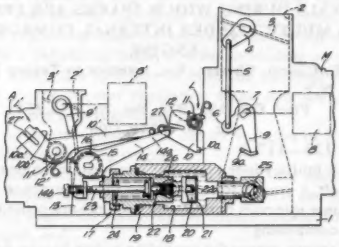
means connected to the second pulse signal means for providing sparks to cylinders in the engine in a predetermined manner in accordance with the second pulse signal.

4,003,355

CARBURETOR CHOKE VALVE CONTROL DEVICE

Takashi Kamezaki, and Masahiko Iiyama, both of Tokyo, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed July 3, 1975, Ser. No. 593,009
Claims priority, application Japan, July 5, 1974, 49-76484
Int. Cl.² F02M *1/10*
U.S. Cl. 123—119 F **6 Claims**



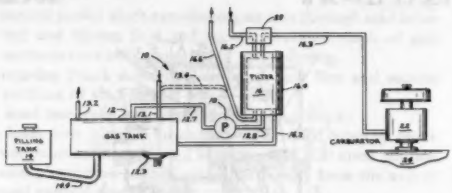
1. For use with an internal combustion piston engine in which each cylinder is provided with a combustion chamber, a choke valve assembly comprising, in combination: a carburetor for supplying an air-fuel mixture to the combustion chambers, said carburetor having a choke valve and an arm connected to operate the choke valve, a thermo-responsive device for operating said choke valve, a locking element having a shoulder, said shoulder adapted to engage the arm to lock said choke valve in open position, a relatively weak spring acting to move said locking element toward an operative position in which said shoulder engages said arm, a bell crank having a first end operatively connected to the locking element and a second end, a relatively strong spring acting on said bell crank to move said locking element against said weak spring to an inoperative position in which said locking element disengages said arm, an engine temperature responsive device operatively connected to the second end of said bell crank, so that when engine temperature is high said device turns said bell crank against said relatively strong spring whereby said shoulder is moved to the operative position.

4,003,356

VAPORIZED FUEL SYSTEM FOR INTERNAL COMBUSTION ENGINES

Harry E. Naylor, Minneapolis, Minn., assignor to Harry E. Naylor, Minneapolis, Minn.; Flora L. Naylor, Belle Vernon, Pa.; John L. Naylor, East Chicago, Ind.; Joseph Naylor, Belle Vernon, Pa.; Lucille E. Hannan, Clairton, Pa.; Eliza M. Naylor, Belle Vernon, Pa. and Daniel Hannan, Clairton, Pa.

Filed Mar. 12, 1975, Ser. No. 557,774
Int. Cl.² F02M *31/00*
U.S. Cl. 123—122 E **13 Claims**



1. Gasoline delivery apparatus for delivering vaporized gasoline free from air and gasoline droplets to an internal combustion engine, comprising a gasoline receptacle; filler means for maintaining the receptacle free of air while permitting the addition of gasoline to the receptacle and maintaining within the receptacle a vapor space above the liquid gasoline level; a heater for heating the gasoline within the receptacle and having an expanded surface extending upwardly into the vapor space; a pump communicating with the vapor space in the receptacle for producing a vacuum in the latter to urge evaporation of gasoline from the expanded surface, and to compress the gasoline vapors; a filter communicating with the high pressure side of the pump to remove gasoline droplets from the vapors compressed by the pump; and means for conveying the filtered gasoline vapors to an internal combustion engine; the gasoline receptacle, pump and filter being sealed from contact with the atmosphere, whereby the gas vapors so delivered are air-free.

4,003,357

CARBURETION SYSTEM FOR INTERNAL COMBUSTION MOTOR

Istvan Furucz, 3964 Saint-Denis, Montreal, Quebec, Canada

Filed Jan. 21, 1975, Ser. No. 542,858
Claims priority, application Canada, Jan. 22, 1974, 190804
Int. Cl.² F02M *11/00*
U.S. Cl. 123—127 **19 Claims**

1. Carburetion system for internal combustion motor having a predetermined number of motor cylinders, said system comprising:

A. a carburetor comprising:

a. a body provided with a number of carburetion chambers which is equal to the number of motor cylinders of the motor to which said body is intended, said body being provided with a motor fuel reservoir, each chamber having means for controlling admission of air therein;

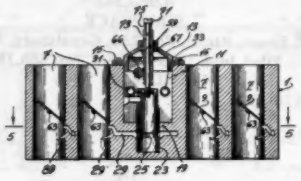
b. a primary circuit individually feeding each carburetion chamber from said reservoir;

c. a control mechanism connecting said means for controlling admission of air and feed of said primary circuit to provide a constant volume ratio of a mixture comprising motor fuel and air which is formed in the carburetion chamber; and

d. a secondary circuit, which is independent from said carburetion chamber, said secondary circuit adapted to directly feed said motor cylinder with an excess of motor fuel from said reservoir;

B. a heat exchanger connected to said carburetor and comprising:

a. a body provided with a number of independent heat



exchange compartments which is equal to the number of carburetion chambers, each compartment being connected to one said chamber so that the mixture carried out in one chamber flows directly into an appropriate compartment;

b. means to bring combustion gases from said motor around said compartments in order to evaporate the fuel of the mixture which flows therein;

c. a secondary circuit, which is independent from said compartments and is connected to the secondary circuit of said carburetor for directly feeding said motor cylinders with an excess of fuel;

d. an admission block connected to said body of said heat exchanger comprising independent admission chambers each being connected to one of said compartments, each chamber being provided with means connecting said chamber also with one of said motor cylinders as well as with said secondary circuit of said heat exchanger in order to enable feeding of each motor cylinder with a mixture of motor fuel and air and with an excess of motor fuel.

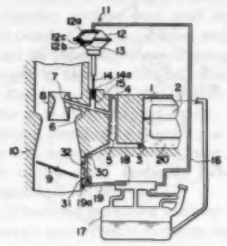
4,003,358

CONTROL SYSTEM FOR CONTROLLING AN AIR-FUEL MIXTURE IN INTERNAL COMBUSTION ENGINE

Yasuo Tatsutomi, and Toru Maeda, both of Hiroshima, Japan, assignors to Toyo Kogyo Co., Ltd., Japan

Filed Aug. 27, 1974, Ser. No. 501,197
Int. Cl.² F02M 37/02
U.S. Cl. 123—136 **8 Claims**

1. In combination, an internal combustion engine having at least one combustion chamber and an intake conduit means communicating between a source of air and said one combustion chamber, and having a throttle valve in said intake conduit means; a fuel tank means having a space in which fuel which has vaporized can collect, and fuel supply means having fuel passage means connected to said fuel tank for receiving fuel from said fuel tank and connected to said intake conduit means or the combustion chamber for feeding fuel in response to the engine operating condition; and a fuel control system comprising: vapor discharge means connected between said intake conduit means downstream of said throttle valve and said space in said fuel tank means for supplying vaporized fuel from said space directly to said intake conduit means; control passage means; and a diaphragm valve assembly having a diaphragm member defining first and second working chambers, said first chamber being in communication with one of the ends of said control passage means, the other end of said



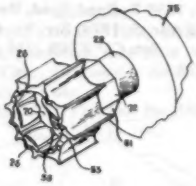
control passage means being in communication with the space in said fuel tank, said second chamber being in communication with the atmosphere, and a valving rod having one end connected to said diaphragm member and the other end situated in said fuel passage means, said valving rod being movable by movement of said diaphragm when the pressure inside said first chamber exceeds a predetermined value for controlling the flow in said fuel passage means.

4,003,359

FLUX WHEEL FOR BREAKERLESS DISTRIBUTOR RETROFIT

Bill J. Hays, 15112 Adams St., Midway City, Calif. 92655

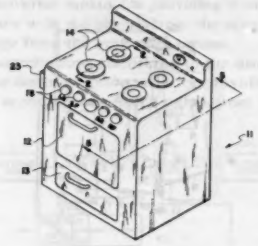
Filed Feb. 11, 1974, Ser. No. 441,651
Int. Cl.² F02P 1/00
U.S. Cl. 123—146.5 A **11 Claims**



1. In a distributor of an internal combustion engine having multiple combustion chambers, which distributor receives a distributor shaft bearing a cam having a number of lobes evenly spaced thereon corresponding to the number of said combustion chambers, a breaker plate mounted beneath said cam and rotatable about said distributor shaft and supporting an induced voltage coil and magnetic assembly, the improvement which comprises:

a pulse wheel comprising a one-piece, integral, generally cylindrical body of a ferro-magnetic metal having an axial through opening with a polygonal cross-section and interior side walls generally conforming to the exterior surfaces of said cam; a plurality, corresponding in number to the number of lobes of said cam, of upstanding axial ribs equally spaced about the periphery of said wheel; and retaining means for securely supporting said wheel on said cam in the form of a continuous wedge-shaped inward protrusion integral with and substantially coextensive with at least one of said interior side walls rigidly secured to and carried on said cam with said wedge-shaped protrusion being press-fitted into binding engagement with and broached by the exterior side surfaces of said cam.

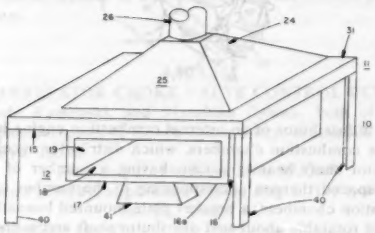
4,003,360
ELECTRIC IGNITION SYSTEM
Charles D. Branson, Greensburg, Pa., assignor to Robertshaw Controls Company, Richmond, Va.
Filed Nov. 20, 1975, Ser. No. 633,732
Int. Cl.² F23Q 7/12
U.S. Cl. 126—39 E **9 Claims**



1. In an electric ignition system for a gas cooking range having electrically conductive side and interior walls and including at least one burner, a gas control valve for regulating the flow of gaseous fuel to said burner, and an electric resistance igniter positioned to ignite said gaseous fuel at said burner when energized, the improvement comprising:

circuit means operated by said valve means for simultaneously energizing said igniter when said control valve is turned on, said circuit means providing two electrically conductive paths connected to said igniter, a portion of one of said electrically conductive paths including the walls of said range.

4,003,361
FIREPLACE ASSEMBLY WITH VARIABLE APPEARANCE
Keith M. Schutt, 1330 E. Rand Road, Des Plaines, Ill. 60016
Filed Apr. 5, 1974, Ser. No. 458,082
Int. Cl.² F24B 1/18
U.S. Cl. 126—120 **5 Claims**



1. A free standing fireplace assembly of a mantel member and a fire box member said mantel member being adapted for joining with the firebox member and interchangeable with mantel members of different design configurations whereby different mantel members may be interchangeably joined with one firebox member to create a variety of different appearances for the assembly, wherein the mantel member comprises a slab-like configuration having a slot which extends through the mantel member from the top surface to the bottom surface and opens to the rear of the mantel member and which receives a mating portion of the firebox member and thereby locks the firebox member and mantel member together as a unitary assembly and wherein the firebox member comprises downwardly extending, interconnected closure panels joined together at a lower portion thereof by a bottom closure panel to define an interior fire chamber and which has a shelf extension at the upper portion thereof extending horizontally outwardly from and around the perimeter of the firebox member said shelf extension being the mating portion received by sliding action into and within the slot of the mantel member said mantel member having a supporting collar positioned at a lower position of the slot and extending horizontally inwardly and about the perimeter of the slot and housed within an open groove formed within the bottom surface of the mantel member and adjacent and about the slot, said groove having a depth sufficient so that the bottom surface of the collar member is flush with the adjacent bottom surface of the mantel member wherein the shelf extension of the firebox slidably rests upon the supporting collar of the mantel member in a supporting arrangement when the mantel member and firebox member are joined together as a unitary assembly, said mantel member is joined with support means which extend downwardly from the mantel member and rest upon a bearing surface so as to support both the mantel member and the firebox member when joined therewith as a unitary assembly.

4,003,362
FIREPLACE
Joseph H. Lener, Rte. 2, Box 252, Grantsburg, Wis. 54840
Filed June 19, 1975, Ser. No. 588,188
Int. Cl.² F24B 7/02
U.S. Cl. 126—121 **8 Claims**

1. A heating unit assembly for use in a closed structure having at least one upright wall provided with an opening therethrough, said heating unit assembly including a heating unit mounted in said opening and having a vertical heating unit face plate inside of said closed structure, said heating unit also including a firebox extending outwardly from said closed structure wall, said firebox being open to the interior of said closed structure through said heating unit face plate, and including a substantially horizontal upper wall, an open top stack providing a flue open to an upper portion of said firebox and extending vertically upward from said upper firebox wall to position outside of said closed structure and in spaced relation to said upright structure wall, a first casing means in surrounding, spaced relation to said firebox and in integral sealing relation to said heating unit face plate to provide an inner passageway between said firebox and said first casing means, a second casing means in surrounding, spaced relation to said first casing means and in sealing relation to said heating unit face plate to provide an outer passageway between said first and second casing means, an open top stack casing in surrounding spaced, concentric relation to the outside of said stack and open to position outside said structure, said stack casing being mounted on an upper portion of said second casing means so that the space between said stack and said

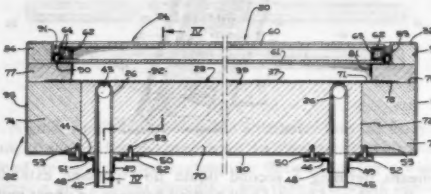
stack casing is open to and forms a part of said outer passageway, there being a cooling air inlet through a bottom portion of said second casing means from outside said closed structure to said outer passageway, there being a heating air inlet conduit through said second casing means and open through a bottom portion of said first casing means from outside said closed structure to the inner passageway, and there being at least one heating air outlet provided through said heating unit face plate and opening from an upper portion of the inner passageway to the interior of said closed structure.

4,003,363

SOLAR PANEL CONSTRUCTION

Abraham Grossman, 9339 Rhea Ave., Northridge, Calif. 91325

Filed June 10, 1974, Ser. No. 477,811
Int. Cl.² F24J 3/02
U.S. Cl. 126—270 **14 Claims**



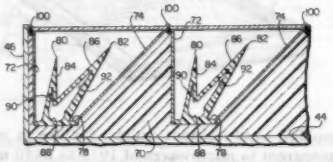
1. A solar panel construction comprising:
a receptacle having a bottom wall, an upstanding peripheral wall, and a top opening defined by said peripheral wall,
a solar collector plate supported below said top opeining;
said plate having tubular means in heat transmitting relation thereto for circulation of a fluid;
said tubular means having inlet and outlet means;
an energy transmitting means spaced above said collector plate in said top opening;
and means for yieldably mounting and maintaining said plate and energy transmitting means in sealed assembly with respect to said receptacle whereby differential expansion and contraction are compensated without impairing said sealed relation,
said mounting means including air permeable means.

4,003,364

SOLAR HEATING SYSTEM

Carl E. Balkus, Jr., 147 Deepwood Drive, Amston, Conn. 06231

Filed Feb. 26, 1975, Ser. No. 553,222
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 **18 Claims**



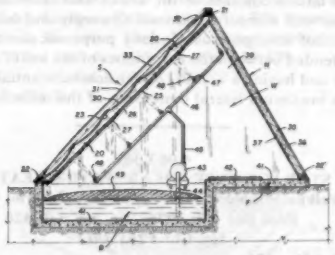
1. A solar heating panel comprising:
a. a generally horizontally extending base,
b. a plurality of generally vertically extending reflective surfaces supported by said base,
c. a plurality of inclined reflective surfaces extending downwardly between said vertical surfaces and also supported by said base,
d. said reflective surfaces defining generally trapezoidally shaped upwardly open cavities therebetween which cavities are wider at their open tops than at their bottoms, and
e. fluid conduits at the bottoms of said cavities extending longitudinally of said cavities and also supported on said base,
f. said conduits each including at least one upwardly projecting fin oriented at an angle between said generally vertical reflective surface and said inclined reflective surface said conduit fabricated from and extruded plastic material, said fin integrally formed therein, and integrally formed flanges in said conduit for attaching said plastic conduit to said base and to absorb solar radiation reaching the bottom of its associated cavity.
9. A solar heating panel comprising:
a. a generally horizontally extending base,
b. a plurality of generally vertically extending reflective surfaces supported by said base,
c. a plurality of inclined reflective surfaces extending downwardly between said vertical surfaces and also supported by said base,
d. said reflective surfaces defining generally trapezoidally shaped upwardly open cavities therebetween which cavities are wider at their open tops than at their bottoms, and
e. fluid conduits at the bottoms of said cavities extending longitudinally of said cavities and also supported on said base,
f. said conduits each including at least one upwardly projecting fin oriented at an angle between said generally vertical reflective surface and said inclined reflective surface and each said conduit fabricated from an extruded plastic material, and wherein said conduit has a fluid opening so defined that a portion of said opening extends upwardly into said fin and said fin having a generally triangular cross sectional shape such that one fin surface faces one of said reflective surfaces and the other fin surface is generally parallel to the other of said reflective surfaces.

4,003,365

STRUCTURE FOR COLLECTING SOLAR ENERGY

James B. Wiegand, Longmont, and John M. Freeman, Jr., Denver, both of Colo., assignors to Solar Energy Research Corporation, Denver, Colo.

Filed Sept. 23, 1974, Ser. No. 508,527
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 **10 Claims**



1. Apparatus for collecting solar energy to heat a liquid, said apparatus comprising, in combination:
a. an enclosed structure having a solar wall angled upwardly from the horizontal at one side of the structure at an inclination exceeding 20° and oriented to receive solar energy;
b. a solar energy transmission sheet forming the outer face of the solar wall;
c. a solar energy absorbing sheet forming the inner face of the solar wall and being spaced from the transmission sheet a distance sufficient to provide an insulting air

space between the sheets, with the outward surface of the solar energy absorbing sheet facing the transmission sheet to receive and absorb solar energy transmitted therethrough and to be heated thereby and with the inward surface of the solar energy absorbing sheet facing the interior of the structure;

d. a pressurized liquid distribution system within the structure, including nozzles spaced from the solar wall and oriented to spray liquid across the space within the structure against substantially the entire inward surface of the solar energy absorbing sheet to wet this surface and thereby effect a transfer of heat from the solar energy absorbing sheet to the liquid sprayed thereon; and

e. a liquid reception basin within the structure below the heat absorption wall to receive liquid flowing from and off the solar energy absorbing sheet.

4,003,366

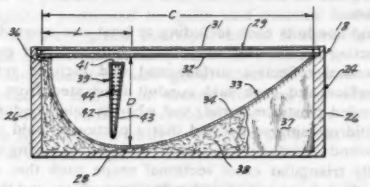
SOLAR HEAT COLLECTOR MODULE

Daniel J. Lightfoot, 415 N. Main St., Sigourney, Iowa 52591

Filed Dec. 11, 1975, Ser. No. 639,847

Int. Cl.² F24J *3/02*

U.S. Cl. 126—271 **6 Claims**



1. A fixed position concentrating solar heat collector module for radiantly absorbing solar heat including:

a. an elongated housing having a transparent top wall,

b. a reflector of a concavo-convex hyperbolic shape having a concave reflecting surface,

c. said reflector positioned within and extended longitudinally of said housing with the concave reflecting surface thereof faced upwardly,

d. means in said housing for thermally insulating the convex surface of said reflector, and

e. a heat collector tube of an elongated triangular shape in transverse cross section longitudinally mounted within the lateral confines of the arc of said reflector having a base wall thereof positioned upwardly and one side wall thereof arranged substantially perpendicular to a chord extended between the extremities of the arc of said reflector and having a vertical dimension substantially equal to the maximum lateral dimension of the reflector.

4,003,367

STORAGE TYPE SOLAR WATER HEATER

Ilmar Veikko Wikholm, R.R. 2, Whitby, Ontario, Canada

Filed Dec. 15, 1975, Ser. No. 640,426

Int. Cl.² F24J *3/02*

U.S. Cl. 126—271 **19 Claims**

1. A solar water heater comprising:

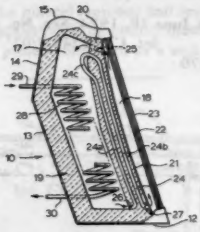
a unitary housing structure providing a liquid-filled thermal storage compartment and a liquid-filled heating compartment,

said housing structure providing a thermally insulating enclosure for said storage compartment, said thermally insulating enclosure including a base portion and a frontal wall portion extending upwardly therefrom,

a heat transmitting window peripherally sealed to said housing structure, the window being spaced from an exterior surface of said frontal wall portion and defining therewith said heating compartment, and

means defining a recirculation path for liquid extending downwardly through said storage compartment and upwardly through said heating compartment, said path defining means including:

means defining a first liquid flow passage extending through said frontal wall portion between a lower end of the portion of said circulation path extending through said storage compartment and a lower end of the portion of said circulation path extending through said heating compartment, said first liquid flow passage providing first and second duct portions extending upwardly within the insulation of the frontal wall portion from said lower ends, and an intermediate duct portion interconnecting said first and second duct portions,



means defining a second liquid flow passage extending through said frontal wall portion between an upper end of the portion of said circulation path extending through said heating compartment and an upper end of the portion of said circulation path extending through said storage compartment,

said recirculation path constituting a thermosiphon responsive to absorption of solar radiation transmitted via said window into the heating compartment, and

heating means in thermal contact with said intermediate duct portion of the first liquid flow passage for inhibiting reverse flow of liquid when the liquid in the heating compartment is cooler than the liquid in the storage compartment.

4,003,368

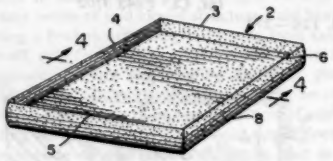
ARTICLE TRANSPARENT TO MICROWAVES AND PROCESS FOR MAKING SAME

John M. Maxel, St. Charles, Ill., assignor to Armco Steel Corporation, Middletown, Ohio

Filed June 27, 1974, Ser. No. 483,794

Int. Cl.² C08F *43/08*

U.S. Cl. 126—390 **4 Claims**



1. A molded burn-resistant article, for use in microwave ovens transparent to microwaves of 1915 to 2450 megahertz, said article having a maximum dielectric constant not greater than 5, having chemical resistance unaffected by detergents, having high abrasion resistance, and being essentially unbreakable under ordinary usage conditions in microwave ovens, and being obtained by molding a sheet molding composition consisting essentially of a mixture of an unsaturated cross linkable polyester of a dicarboxy acid and a dihydric alcohol, a cross linking inhibitor, a chemically inert powdered filler, a thermoplastic polymer, a cross linking monomer capa-

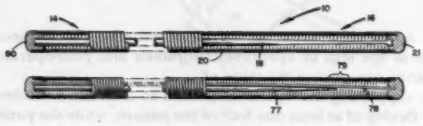
ble of cross linking with said polyester to form a thermosetting resin, cut bundles of glass filaments, a catalyst for the cross linking reactant, a thickening agent, and a mold release ingredient, said sheet molding composition containing 5% to 35% by weight of cut bundles of glass filaments ¼ inch to 3 inches long, between solid smooth heated dies at pressures and temperatures sufficiently high to cause cross linking between said polyester and said cross linking monomer.

4,003,369

ANGIOGRAPHIC GUIDEWIRE WITH SAFETY CORE WIRE

Marlin S. Heilman, Gibsonia, and Seid W. Waddell, Tarentum, both of Pa., assignors to Medrad, Inc., Pittsburgh, Pa.

Filed Apr. 22, 1975, Ser. No. 570,999
Int. Cl.² A61B 5/02
U.S. Cl. 128—2 M **10 Claims**



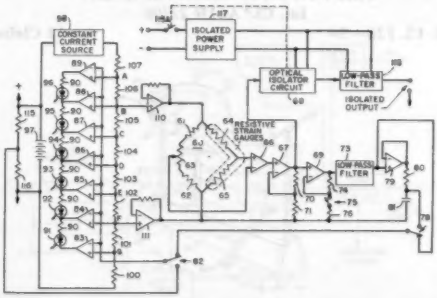
1. A guidewire adapted to guide a catheter into the body of a patient, the guidewire comprising: an elongated outer casing defined by an elongated rectangular flatwire having a width dimension and a height dimension less than said width dimension and having been wound into a coil spring wherein the surface of said outer casing is defined by consecutive coils of contacting widths; and a coating of coating material completely encasing the the flatwire which defines the coils of the coil spring; wherein said flatwire is coated prior to being wound.

4,003,370

BLOOD PRESSURE MONITOR SYSTEM AND METHOD

Tuncay Emil, Fountain Valley, and Kenneth Elmer Stack, Laguna Hills, both of Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.

Filed Oct. 14, 1975, Ser. No. 622,209
Int. Cl.² A61B 5/02
U.S. Cl. 128—2.05 D **15 Claims**



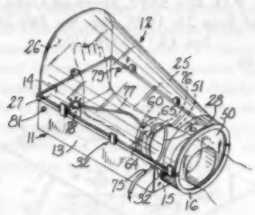
1. Apparatus for measuring blood pressure comprising: transducer means sensing blood pressure for generating a signal representative of instantaneous pressure; reference voltage source means for generating a plurality of reference signals of progressively increasing magnitude; a plurality of light-emitting circuit means connected in series; and a plurality of comparator circuit means, each having an output connected to a junction between adjacent ones of said light-emitting circuit means, each comparator circuit means further having a first input connected to an associated reference signal of said reference voltage source means, and a second input receiving said signal representative of instantaneous pressure; whereby all comparator circuits having their first inputs at a higher potential than their associated reference voltages will have their outputs at a first level, and all comparator circuits having their signal inputs at a lower potential than their associated reference voltages will have their outputs at a second level, and one light-emitting circuit means will be energized and representative of the sensed pressure.

4,003,371

LOW PRESSURE HYPERBARIC CHAMBER

Boguslav H. Fischer, 251 E. 32nd St., New York, N.Y. 10016

Continuation-in-part of Ser. No. 549,608, Feb. 13, 1975, abandoned. This application Jan. 28, 1976, Ser. No. 653,199
Int. Cl.² A61M 13/00
U.S. Cl. 128—184 **8 Claims**



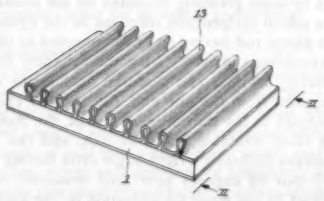
5. A low pressure hyperbaric chamber for treatment of a part of a patient's body comprising, an elongated enclosure having a closed end and an entrance end, said enclosure including separable lower and upper portions, means for releasably holding said portions in sealing engagement, a gas supply passage and a gas exit passage, the entrance end being adapted to permit introduction of said body part into the enclosure and being provided with a tubular sleeve of foldable material mounted at one end in said entrance end, the other end of the sleeve projecting freely into the chamber, an inflatable strap containing at least one gas passageway provided with a gas inlet, said strap being attached adjacent one of its ends to the sleeve adjacent said other end of the sleeve, the gas supply passage being connected to said gas inlet, a humidifier, and means connecting the gas supply passage to said humidifier.

4,003,372

FOOT WASHING AND MASSAGING DEVICE

Carl J. Willoby, Lompoc, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Oct. 6, 1975, Ser. No. 619,639
Int. Cl.² A61H 1/02
U.S. Cl. 128—25 B **5 Claims**



1. A foot washing and massaging device, comprising

a substantially plate-like base member of water-impervious material having spaced opposite parallel substantially planar surfaces;

a plurality of suction cups affixed to one of the surfaces of the base member for releasably securing the base member in position on a supporting surface; and

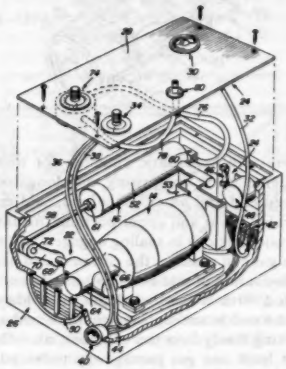
a sheet of pliable, resilient water-impervious material affixed to the other of the surfaces of the base member in substantially undulating configuration in a manner whereby when the device is positioned in a shower or tub and the feet of a user are rubbed on the sheet of resilient material said feet are washed and massaged simultaneously.

4,003,373

VARIABLE PULSATING VACUUM DEVICE

Peter N. Spelio, P.O. Box 5857, Sherman Oaks, Calif. 91403

Filed June 23, 1975, Ser. No. 589,453
Int. Cl.² A61H 1/00
U.S. Cl. 128—40 9 Claims



1. A variable pulsating vacuum pneumatic device, comprising, in combination:

a. a frame;

b. a motor mounted on the frame;

c. a vacuum pump mounted on the frame and connected to an applicator arrangeable in contact with facial and neck tissues to be treated;

d. transmission means for connecting the motor to the vacuum pump; and

e. control means for regulating the pulse rate of the vacuum pump as a function of the speed of the motor, the vacuum pump including, in combination:

1. a cylinder pivotally mounted on the frame;

2. a piston reciprocally disposed in the cylinder;

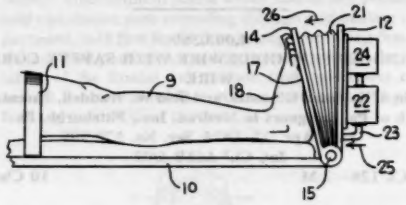
3. a piston rod having an end connected to the piston and extending outwardly from the cylinder, the piston rod having another end disposed outside the cylinder and spaced from the one end, the another end being connected to the transmission means, the motor including a shaft rotatable about an axis, and the transmission means including a right-angle drive having an input and output 90 degrees apart and mounted on the motor shaft by the input for actuation by the motor shaft, the cylinder and piston rod of the pump being arranged substantially parallel to the axis of rotation of the motor shaft, the output of the right-angle drive including an output shaft, and a crank connected at spaced points pivotally to the another end of the piston rod and affixed to the output shaft of the drive for rotation by the latter, the rotary motion of the crank being converted to a reciprocating movement of the piston rod.

4,003,374

METHODS AND APPARATUSES FOR THE PREVENTION OF VENOUS THROMBOSIS

Benjamin Mizrachy, 202 South St., Middletown, N.Y. 10940

Filed Nov. 18, 1975, Ser. No. 633,030
Int. Cl.² A61H 7/00
U.S. Cl. 128—48 19 Claims



1. A method of reducing the risk of incurring venous thrombosis in the legs of operative, bedridden and post-operative patients, comprising the steps of:

A. supporting the legs of the patient so as to allow for dorsiflexing of at least one foot of the patient, while the patient is anesthetized during surgery,

B. anesthetizing the patient for the purpose of performing surgery upon the patient; and

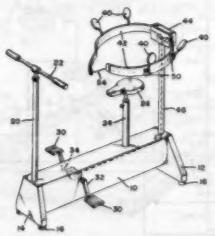
C. periodically dorsiflexing at least one foot of said patient while so anesthetized during surgery, so as to cause calf muscles of the associated leg to move and prevent stasis of blood in said leg, whereby the risk of incurring venous thrombosis is reduced in said patient.

4,003,375

EXERCISE AND MASSAGING APPARATUS

Luther G. Simjian, 7 Laurel Lane, Greenwich, Conn. 06830

Filed Nov. 17, 1975, Ser. No. 632,239
Int. Cl.² A61H 23/00
U.S. Cl. 128—54 11 Claims



1. An exercise and massaging apparatus comprising:

a stationary support;

motive means in the form of pedal means mounted to said support;

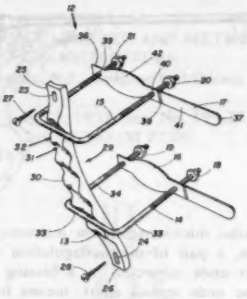
a belt adapted to be secured to a person, said belt including a plurality of movable striking elements, and

coupling means coupling said pedal means to said striking elements for causing responsive to the operation of said pedal means said striking elements to periodically undergo motion for striking the person.

4,003,376
APPARATUS FOR STRAIGHTENING THE SPINAL COLUMN

Douglas William McKay, Washington, D.C.; Teddy L. Bolinger, and Norman L. Emerick, both of Warsaw, Ind., assignors to Bio-Dynamics, Inc., Indianapolis, Ind.

Filed Aug. 25, 1975, Ser. No. 607,108
Int. Cl.² A61F 5/00
U.S. Cl. 128—69 **11 Claims**

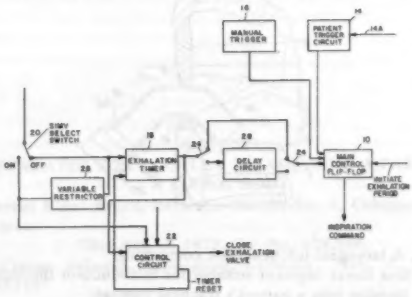


1. A device for straightening the spinal column comprising:
an elongated first member with length insertable forwardly of and adjacent the spinal column so as to extend lengthwise along said spinal column;
first means operable to attach said member to said spinal column limiting relative motion between said member and said spinal column; and,
second means extendable from said member around said spinal column and back to said member being operable to force said spinal column to contact said member along said length of said member straightening said spinal column.

4,003,377
PATIENT VENTILATOR

William R. Dahl, Littleton, Colo., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed Aug. 21, 1975, Ser. No. 606,644
Int. Cl.² A61M 16/00
U.S. Cl. 128—145.8 **4 Claims**

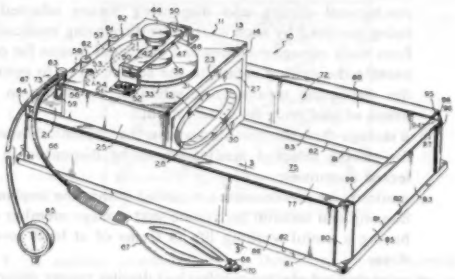


1. In a patient ventilator including a device for supplying air to a patient through a ventilating hose, a conduit through which the patient may exhale, and circuitry for controlling the breathing of a patient and for assisting the voluntary breathing of a patient, an improvement comprising:
means for initiating an inspiration half-cycle of a breathing period during which air is supplied to a patient through a ventilating hose; means for initiating an exhalation half-cycle of a breathing period during which the patient may exhale through a conduit; a patient trigger circuit means for sensing an inhalation attempt by the patient, said patient trigger circuit having an output coupled to actuate said inspiration initiating means; timer means having an output for providing a trigger signal at the end of a predetermined period; delay circuit means coupled between said timer means output and an input to said inspiration initiating means for actuating the latter, unless previously actuated by said patient trigger means, after a delay period responsive to said timer means trigger signal; means for selectively opening and closing the exhalation conduit; and control circuit means having an input coupled to said timer means output, having a first output coupled to actuate said conduit opening and closing means for closing said conduit during inspiration half-cycles initiated immediately subsequent to the generation of trigger signals by said timer means, and for opening said conduit during all other portions of said breathing periods, and said control circuit means having a second output coupled to said timer means for resetting said timer means when said immediately subsequent inspiratory half-cycles are initiated, wherein the patient's voluntary breathing is interrupted intermittently in response to said predetermined timing period, whereafter a mandatory inspiration half-cycle is applied as a result of the said closing of the exhalation conduit, said mandatory inspiration half-cycle being synchronized with the patient's voluntary inhalation in response to said patient trigger means.

4,003,378
TRANSPORT AND LIFE-SUPPORT SYSTEM FOR INFANTS

Donald E. Pickering, 890 Mill St., Suite 400, Reno, Nev. 89502

Filed Oct. 18, 1974, Ser. No. 516,119
Int. Cl.² A61M 16/02
U.S. Cl. 128—204 **14 Claims**

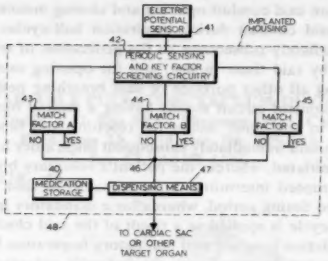


1. A life-support hood for an infant comprising:
a bottom;
a rigid transparent top;
a plurality of rigid transparent sides, one of said sides being provided with a body entrance opening therein, said opening being adapted to receive the head, shoulders, arms and chest of an infant within said hood with the rest of the body of said infant extending outside said hood;
sealing means within said opening for adhesively attaching and sealing said chest of said infant to said one side of said hood to selectively create a gas-tight enclosure;
a first port for introducing air and oxygen into said hood; and
a second port for regulating the pressure of said air and oxygen within said hood, such that the gas pressure within said hood can be maintained at levels above ambient atmospheric pressure for providing continuous positive airway pressure in said infant.

4,003,379
APPARATUS AND METHOD FOR IMPLANTED SELF-POWERED MEDICATION DISPENSING

Everett H. Ellinwood, Jr., 3519 Tonbridge Way, Durham, N.C. 27707

Division of Ser. No. 463,262, April 23, 1974, Pat. No. 3,923,060. This application Sept. 24, 1975, Ser. No. 616,294
The portion of the term of this patent subsequent to Dec. 2, 1992, has been disclaimed.
Int. Cl.² A61M 5/00, 7/00
U.S. Cl. 128—260 22 Claims



1. A self-contained and powered implant apparatus adapted to be totally received within a selected animal body, including human, for periodically dispensing selected medication therein while leaving the body ambulatory at all times, comprising:

a. a unitary housing adapted to be completely implanted and secured within and to the body at a selected site and having therein various compartments enclosed by said housing and adapted for mounting a medication storage member, a micro size power source, miniaturized electro-mechanical driving and dispensing means adapted to being powered by such source for dispensing medication from such storage member and electrical means for connecting the driving means to the source so as to operate the dispensing means on a schedule according to the needs of said body for medication;

b. a storage member mounted within the implanted housing for storing selected medication to be dispensed in selected quantities;

c. a micro size power source mounted within the implanted housing and secured proximate said storage member and having a useful working life in terms of at least several days;

d. miniaturized electro-mechanical driving means mounted within the implanted housing selectively connected to and powered by said source;

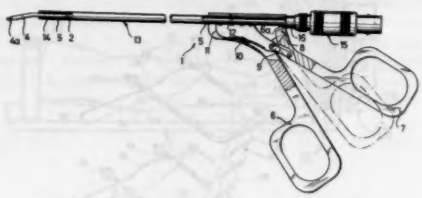
e. miniaturized dispensing means mounted within the implanted housing and having a retractable flexible walled container means with an inlet connected to receive medication from said storage member and connected for being powered by said driving means and when so powered and when expanded, receiving from said storage member through said inlet and into said container means successive measured quantities of selected said medication and having an outlet means for enabling discharge of such medication from said container means through the wall of the implanted housing and into said body during compression of said container means; and

f. electrical means mounted within the implanted housing for providing an electrical connection between said power source and said driving means for driving, energizing and actuating said dispensing means including said container means on a controlled schedule in coordination with the medical needs of the body.

4,003,380
BIPOLAR COAGULATION INSTRUMENT

Peter Wien, Freiburg, Germany, assignor to F.L. Fisher, Freiburg, Germany

Filed Aug. 29, 1975, Ser. No. 609,052
Claims priority, application Germany, Sept. 5, 1974, 2442605
Int. Cl.² A61B 17/40; A61N 3/06
U.S. Cl. 128—303.17 17 Claims

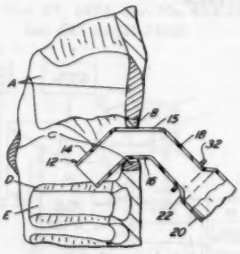


1. A bipolar microcoagulation instrument comprising, in combination, a pair of microcoagulation electrodes having spread-apart ends subjected to a biasing force tending to maintain the ends spread apart; means for connecting the electrodes to the terminals of a high-frequency voltage source; an outer tube surrounding the microcoagulation electrodes, the spread-apart ends of the electrodes projecting outwards from inside the outer tube, and the outer tube being shiftable relative to the electrodes at least against the ends of the electrodes and at least partly over the ends of the electrodes to press together the ends of the electrodes; activating means including handles for thusly shifting the outer tube; and means for rotating the electrodes relative to the outer tube and the handles of the activating means.

4,003,381
CRICOTHYROSTOMY INSTRUMENT

Max I. Gilbert, 9612 N. Military Trail, Palm Beach Gardens, Fla. 33407

Division of Ser. No. 483,727, July 3, 1974, Pat. No. 3,906,956. This application Apr. 30, 1975, Ser. No. 573,223
Int. Cl.² A61B 17/24
U.S. Cl. 128—305.3 4 Claims



1. A laryngeal-tracheal tube comprising:

a first linear segment suitable for introduction through an incision into a patient's tracheal passage;

a second linear segment angulated to said first segment, said first and second segments subtending an obtuse angle; and

a third linear segment angulated to said second segment, said third and second segments subtending an obtuse angle, whereby said first segment and said third segment from an angle of approximately 90° with respect to each other and said third segment being suitable for positioning to extend through the incision in the patient's laryngeal-tracheal region whereby said first segment of said

laryngeal-tracheal tube may be inserted through said incision and said second and third segments may be incrementally successively advanced to where said third segment is positioned so as to extend through said incision.

4,003,382

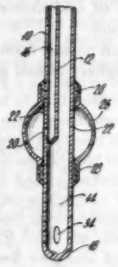
RETENTION CATHETER AND METHOD OF MANUFACTURE

Denis G. Dyke, Fords, N.J., assignor to Ethicon, Inc., Somerville, N.J.

Filed July 25, 1975, Ser. No. 599,293

Int. Cl.² A61M *25/00*

U.S. Cl. 128—349 B **11 Claims**



1. A retention catheter comprising:

a. an elongated flexible thermoplastic tube having a distal end and a proximal end and having a drainage lumen and an inflation lumen defined by the walls of said tube and extending from said proximal end to near said distal end, said inflation lumen terminating in an inflation port in the wall of the tube near the distal end thereof, said drainage lumen terminating in a drainage port in the wall of the tube intermediate said inflation port and said distal end, and

b. a cylindrical thermosetting polyurethane balloon sleeve encircling a longitudinal section of said tube containing said inflation port and having end margins sealed to said tube on either side of said inflation port.

4,003,383

APPARATUS FOR LOCALLY IRRADIATING A PART OF A LIVING BODY

Gernot Klaus Brück, Hermann-Pfaume-Str. 6, Cologne, Germany

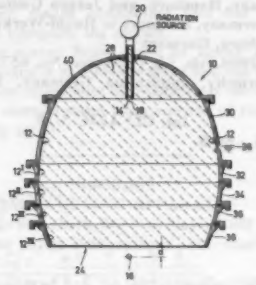
Filed Nov. 3, 1975, Ser. No. 628,546

Claims priority, application Germany, Nov. 4, 1974, 2452227

Int. Cl.² A61N *5/04*

U.S. Cl. 128—404 **16 Claims**

1. Apparatus for locally irradiating a part of a living body, the apparatus comprising means for emitting radiation from a point, a casing surrounding said radiation emission point, said casing being positionable above a body in the region of the part requiring treatment, and having an interior provided with a surface capable of reflecting radiation from said emission point, said surface being greater than half an ellipsoid, said emission point being within said casing arranged at a first focus point of said ellipsoid whereby said part to be irradiated is positionable at the second focus point of said ellipsoid



outside said casing to receive focused radiation reflected from said surface.

4,003,384

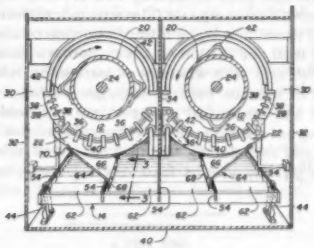
GRAIN DISTRIBUTION MEANS FOR ROTARY COMBINE

John J. Komancheck, New Holland, and Robert R. Todd, Leola, both of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.

Filed Mar. 29, 1976, Ser. No. 671,648

Int. Cl.² A01F *7/00*

U.S. Cl. 130—27 T **12 Claims**

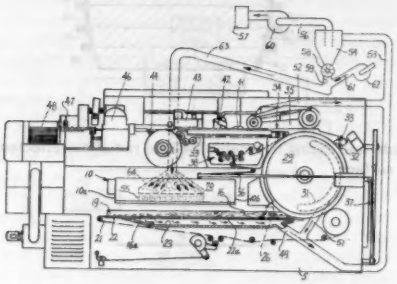


1. A mobile combine having threshing means carried thereby and comprising rotor and cooperating concave means, means on the forward end of the combine operable to feed material to said threshing means, a grain pan supported upon said combine below said threshing means to receive threshed crop material from said threshing means, sieve means supported within said combine rearwardly of said grain pan to receive threshed crop material from said grain pan and operable to separate desired crop material from chaff and other waste material, movable means in said combine supporting said grain pan and sieve means for fore-and-aft reciprocation within said combine to effect such separation, and power means operable to actuate said threshing means and reciprocate said grain pan and sieve means as aforesaid; the improvement comprising at least one angularly disposed deflector member fixed to said grain pan and reciprocable therewith, said deflector member respectively extending downward and inward toward said grain pan from the side edge thereof below said concave means and operable to deflect crop material discharged from said concave toward the center of said grain pan and thereby minimize tendencies for crop material to gravitate to the side of the grain pan.

4,003,385
METHOD AND MACHINE FOR MAKING CIGARETTES OR THE LIKE

Klaus Adebahr, Hamburg, and Jurgen Gomann, Dassendorf, both of Germany, assignors to Hauni-Werke Korber & Co., KG, Hamburg, Germany

Filed Feb. 11, 1976, Ser. No. 657,239
Claims priority, application Germany, Feb. 18, 1974, 2506839
Int. Cl.² A24C 5/18
U.S. Cl. 131—84 B 22 Claims



1. A method of making a continuous tobacco filler stream, comprising the steps of accumulating and maintaining — in a first portion of a predetermined path — a supply of tobacco which contains relatively large particles and relatively small particles including short tobacco and smaller and larger particles of tobacco dust; withdrawing from said supply a continuous layer of tobacco and transporting said layer along a second portion of said path; showering the tobacco of said layer into an elongated stream building zone constituting a third portion of said path to thereby convert said layer into said filler stream; conveying said filler stream lengthwise along said third and thereupon along a fourth portion of said path; conveying at least one suction air stream across at least one of said portions of said path whereby at least some relatively small particles of tobacco become segregated from the remaining particles and leave said one portion with said air stream; separating at least some relatively small particles from said air stream; and introducing the thus separated relatively small particles directly into at least one selected portion of said path.

4,003,386
DEVICE FOR SECURING TIPS TO ROD-SHAPED ARTICLES SUCH AS CIGARETTES

Hubert Bald, and Helmut Demny, both of Gevelsberg, Germany, assignors to Maschinenfabrik Alfred Schmermund, Gevelsberg, Germany

Filed Apr. 14, 1975, Ser. No. 567,966
Claims priority, application Austria, Apr. 19, 1974, 3294/74
Int. Cl.² A24C 5/58
U.S. Cl. 131—94 20 Claims

1. A device for securing tips to rod-shaped articles, comprising in combination:-

a frame;

a carrier drum rotatably mounted on said frame and adapted to carry a plurality of assemblies each comprising a tip component and two axially aligned rod-shaped articles disposed to abut against respective end surfaces of said tip component;

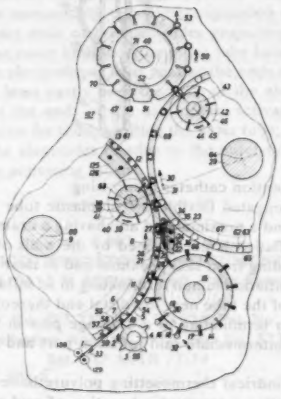
a grooved drum rotatably mounted on said frame and provided with a plurality of recess defining means disposed at intervals around the periphery of said grooved drum, each recess defining means defining a respective axially extending recess in the periphery of said grooved drum;

feeder means for feeding successive connecting sheets each provided with adhesive material on one surface thereof towards the peripheral surface of said grooved drum, each said connecting sheet being fed to overlie a respective one of said recesses with said one surface thereof facing outwardly of said grooved drum and with a portion of said connecting sheet, extending from a leading extremity of said recess on rotation of said drum, being longer than a portion of said connecting sheet extending from a trailing extremity of said recess;

urging means provided on said carrier drum to urge said assemblies carried by said carrier drum into said recesses in said grooved drum, whereby on said assembly being urged into the respective one of said recesses, said connecting sheet is partially wrapped around the periphery of said assembly and a free end portion of said connecting sheet is left outside of said recess at said leading extremity thereof;

vacuum means within said drum for initially holding said free end portion of said connecting sheet against the surface of said drum,

guide means mounted on said frame in juxtaposed relationship with the periphery of said grooved drum,



means for terminating the operation of said vacuum means before said free end portion reaches said guide means during the rotation of said drum, whereby said free end portion is released to extend outwardly from the surface of said drum, a stationary guide member provided on said guide means and disposed in a path traversed by said free end portion on rotation of said grooved drum, whereby said outwardly extending free end portion of said partially wrapped connecting sheet is deflected by said guide member whilst said assembly remains in said recess to cause said one surface of said free end portion to be disposed in mutually facing relatonship with said peripheral surface of said grooved drum;

ejector means operatively associated with said grooved drum to eject said partially wrapped assemblies from said recesses; and

further carrier means displaceable in co-ordination with the rotation of said grooved drum and provided with a plurality of further recess defining means each defining a recess adapted to receive said partially wrapped assemblies ejected by said ejector means from said grooved drum, said further recess defining means being adapted to act on said free end portion of said connecting sheet to complete the wrapping of said connecting sheet around the periphery of said assembly.

4,003,387

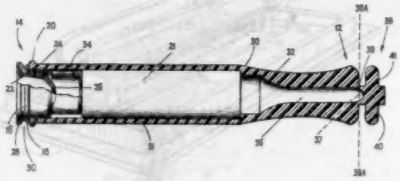
CIGARETTE FILTER HOLDER

Jerome J. Goldstein, Denver, Colo., assignor to Aquafilter Corporation, Farmington Hills, Mich.

Continuation of Ser. No. 536,880, Dec. 27, 1974, abandoned. This application Feb. 26, 1976, Ser. No. 661,630

Int. Cl.² A24F *13/02*

U.S. Cl. 131—173 **4 Claims**



1. A disposable cigarette holder construction comprising:

an elongated plastic cigarette holder having an opening at one end shaped to receive the tip of a cigarette,

a removable cap extending over said opening,

said holder also having a passage extending from said opening to the other end of said holder,

a fluid containing member positioned in said passage, and

a removable plug integrally formed with said holder removably closing said passage at said other end,

said other end of said holder including means defining an end surface extending normal to the axis of the holder, wherein said integrally formed removable plug comprises a member extending from the other end of said holder and integrally formed with said holder along an annular segment having a thickness less than adjacent portions of said plug and holder, with said segment lying coplanar with said end surface, defining the end of said passage and adapted upon removal to provide an opening to said passage through said other end, said annular segment, when removed, defines an annular surface that is flush with the end surface surrounding the annular surface,

said plug extending lengthwise of said holder with wings projecting outwardly therefrom to provide finger grips for twisting said plug,

said passage terminating in an end with progressively smaller radii defining the end surface thereof and extending into the plug a slight distance which is less than the distance between the end surface of said holder and a center line of said wings which is normal to the axis of said holder.

4,003,388

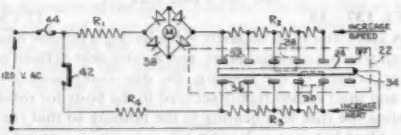
HAIR DRYER VARIABLE CONTROL

Esko J. Nopanen, Asheboro, N.C., assignor to General Electric Company, Bridgeport, Conn.

Filed Apr. 1, 1976, Ser. No. 672,611

Int. Cl.² A45D *20/00*

U.S. Cl. 132—9 **8 Claims**



1. In a hair dryer having an electric selectively variable motor driven fan, plural wattage heaters disposed in the fan stream for selectively heating the air, and thermostat means sensing air temperature to shut off the dryer on over-temperature condition, the improvement in a combination switch and sliding contact variable control for heat and speed comprising,

an elongated continuous bus bar connected to one side of the line,

a plurality of discrete fixed spaced contacts connected to the other side of the line with each contact connected to change resistance in the circuit,

sliding contact means connecting said bar and spaced contacts to complete the circuit,

said sliding means being sized to bridge at least two spaced contacts as it moves along said bar for a smooth continuous adjustment of resistance in the circuit as the movable contact slides from one end of the continuous bar to the other.

4,003,389

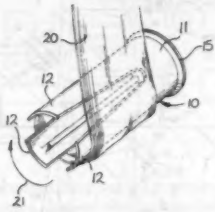
HAIR CURLING APPARATUS

Eric L. Waite, 14808 Clark St., Van Nuys, Calif. 91411, and Mary I. Waite, 14101 Ventura Blvd., Sherman Oaks, Calif. 91403

Continuation-in-part of Ser. No. 405,886, Oct. 12, 1973, Pat. No. 3,939,852. This application Dec. 18, 1975, Ser. No. 641,890

Int. Cl.² A45P *2/00*

U.S. Cl. 132—40 **9 Claims**



1. A hair curling apparatus comprising:

a. a cylindrical base;

b. a plurality of uniformly disposed extension members longitudinally depending from said cylindrical base and defining a substantially cylindrical cavity, each of said extension members being defined by a pair of lateral edges and a terminus in axial opposition to said cylindrical base, the lateral edges of adjacent pairs of extension members converging to an apex which is in the vicinity of said cylindrical base; and

c. a circular flange integral with said cylindrical base, the interface intermediate said circular flange and said cylindrical base being a continuous curved surface.

4,003,390

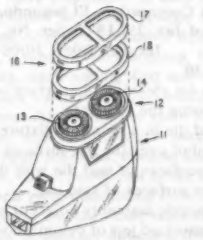
HAIR CUTTING GUIDE FOR ELECTRIC RAZOR

Edward A. Solie, 5484 Ranchito Way, Santa Rosa, Calif. 95401

Filed Sept. 8, 1975, Ser. No. 611,505

Int. Cl.² A45D *24/36*

U.S. Cl. 132—45 R **5 Claims**



1. Guide means for an electric razor comprising at least one guide member having means defining an apertured upper surface with a depending frame thereabout dimensioned to fit

upon the head of an electric razor and having clip means on said frame for removably engaging said element with the head of an electric razor about blades thereof to dispose said apertured upper surface in predetermined spaced relation above said blades, and said frame having indentations located in line with said clip means adapting said guide member for engagement with another guide member atop same.

4,003,391

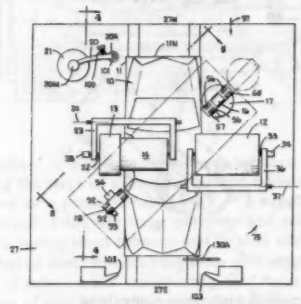
TURNTABLE CAR WASHING METHOD USING POWER RUBBING DEVICES

Judson L. Smith, 3714 S. Juniper St., Tempe, Ariz. 85281

Continuation of Ser. No. 450,997, March 14, 1974, abandoned, which is a division of Ser. No. 188,292, Oct. 12, 1971, Pat. No. 3,797,059. This application Nov. 28, 1975, Ser. No. 635,944

Int. Cl.² B08B *1/04*

U.S. Cl. 134—6 **5 Claims**



1. A method of cleaning a vehicle and comprising the steps of:

moving a passenger carrier vehicle through an entrance into a position adjacent an array of rubbing devices;

moving said devices in contact with surfaces of the vehicle and power driving said devices while in contact with said surfaces and thereby power rubbing said surfaces; and

rotating the vehicle in the array to move different surfaces of said vehicle into contact with said rubbing devices; and

applying one of said devices to passenger compartment roof and windows of the vehicle and driving the one device in a uniform direction with respect to said entrance while rotating the vehicle to thereby obtain various directions of rubbing action against large percentages of the roof and window area of the vehicle.

4,003,392

PROCESS AND APPARATUS FOR CLEANING MOS-LSI DIE

Robert L. Schaefer, Anaheim, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jan. 29, 1976, Ser. No. 653,571

Int. Cl.² B08B *3/00*

U.S. Cl. 134—30 **12 Claims**

1. A process for cleaning the surface of MOS-LSI die, said process comprising the steps of:

installing said die in a manifold fixture;

spraying alcohol over the die surfaces,

flushing the surfaces of said die with deionized water;

scrubbing the surfaces of said die;

mounting a nozzle assembly adjacent said manifold fixture;

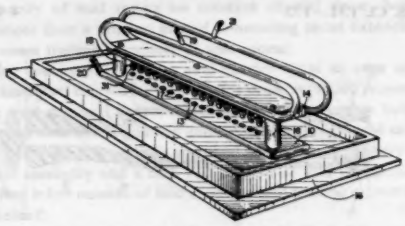
directing pressurized jets of deionized water and pressurized jets of alcohol on said die surfaces from said nozzle assembly; and

drying said die surfaces with streams of dry gas.

7. Apparatus for cleaning MOS-LSI die chips comprising:

manifold fixture means for securing a plurality of die chips;

said manifold fixture means including a plurality of cavities therein for securing cavity inserts of variable sizes and having small apertures that align with similar apertures in said cavities leading to a vacuum source for securing said die chips in said cavity inserts;



multi-nozzle assembly means associated with said manifold fixture for directing pressurized fluid onto said die chips; and

cleaning tank means for supporting said manifold fixture and said multi-nozzle assembly.

4,003,393

GEL-LIKE COMPOSITION FOR USE AS A PIG IN A PIPELINE

William Jaggard, and Allen A. Scales, both of Calgary, Canada, assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 14, 1973, Ser. No. 332,324

Int. Cl.² B08B *9/04*

U.S. Cl. 137—15 **5 Claims**

1. A method of removing residual fluids and solids from a pipeline which comprises:

a. as an initial step treating the inner surface of the pipeline to remove solid and semi-solid deposits therefrom;

b. introducing into said pipeline a gel-like mass composed of an organic liquid which is gelled with a gelling quantity of a metal salt of an aliphatic substituted orthophosphate ester, and

c. moving said gel-like mass through said pipeline under pumping pressure which forms said gel-like mass into a self-sustaining body having its peripheral surfaces contiguous with the inner surfaces of the pipeline to remove residual liquids and solids therefrom.

4,003,394

DISC VALVE WITH IMPROVED SEAL RING

Horst Adams, Bochum, Germany, assignor to Panamera, A.G., Chur, Switzerland

Filed Sept. 9, 1975, Ser. No. 611,764

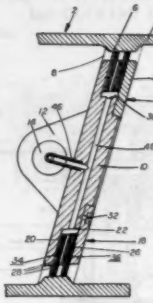
Claims priority, application Germany, Sept. 12, 1974, 2443723; July 23, 1975, 2532879

Int. Cl.² F16K *1/22*

U.S. Cl. 137—15 **17 Claims**

1. A valve disc for a butterfly valve having a tubular housing through which a material flows, and a valve seat defined on an interior surface of the housing, the disc comprising a main body and shaft means rigidly secured to the body for rotatably mounting the disc to a bearing in the housing so that the disc can be tilted between a closed position in which a periphery of the body is proximate the seat and an open position in which the disc is substantially parallel to an axis through the housing, the body including in a side thereof a recess extending to a periphery of the disc and at least one seal ring positioned in the recess, the seal ring having an outer diameter larger than the periphery of the body and an inner diameter larger than an inner diameter of the recess so that the seal ring can slide relative to the body when positioned in the recess, a locking ring engaging a side of the seal ring facing away from the body,

and means securely tightening the locking ring against the seal ring to lock the seal ring relative to the body and prevent relative movements therebetween, whereby the seal ring can



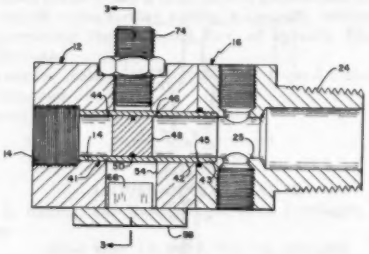
be centered relative to the valve seat by first releasing the locking means, thereafter closing the disc to engage a periphery of the seal ring with the valve seat, and thereafter tightening the locking means.

4,003,395

QUICK-OPENING VALVE OPERATED BY EXPLOSIVE CHARGE

Maurice Eugene Tyler, Orinda, Calif., assignor to Systron Donner Corporation, Berkeley, Calif.

Filed July 28, 1975, Ser. No. 599,866
Int. Cl.² F16K *13/06*; A62C *37/06*
U.S. Cl. 137—68 A **3 Claims**



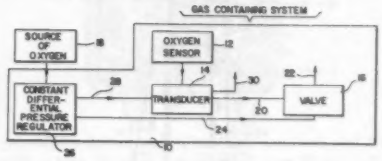
1. In a system for distributing a fluid under pressure, the combination of a valve body having a cylindrical cavity with an inlet, an outlet and a passageway between the inlet and outlet, distributor means for directing fluid from the outlet to one or more end use locations, a cylindrical flow-blocking member removably mounted within the cavity, said member having a uniform outside diameter commensurate with the inside diameter of the cavity, said member including an imperforate plug and a pair of tubular ends extending axially from the plug, means for detachably and slidably mounting the tubular ends in the passageway for forming a continuation thereof, means forming a pair of axially spaced-apart weakened zones which extend circumferentially around the cylindrical member adjacent respective ends of the plug, charge means mounted in the body for applying an exploding gas directly against the outer surface portion of the flow-blocking member adjacent the plug whereby said outer surface portion and plug shear at weakened zones and separate from the member to form a slug portion which moves along an ejection path which is substantially orthogonal with said passageway whereby after said separation the passageway through the valve body is substantially unobstructed for easy removal of the remaining parts of the flow-blocking member and for replacement of a complete flow-blocking member, deflector means for deflecting the slug portion along a second path inclined from the ejection path for absorbing kinetic energy of the moving slug portion, and means forming a chamber within the valve body in alignment with said second path for receiving said slug portion and holding the latter substantially clear of the passageway whereby flow is established along the passageway to said outlet.

4,003,396

PROPORTIONAL CONTROL CLOSED CIRCUIT GAS ADMISSION SYSTEM

Lewis W. Fleischmann, 8502 Allenswood Road, Randallstown, Md. 21133

Division of Ser. No. 278,725, Aug. 8, 1972, Pat. No. 3,861,412. This application Nov. 21, 1974, Ser. No. 526,057
The portion of the term of this patent subsequent to Jan. 21, 1992, has been disclaimed.
Int. Cl.² A62B *7/02*; F16K *31/12*
U.S. Cl. 137—83 **5 Claims**



1. Apparatus for controlling partial pressure of a controlled gas in a gas -containing system, which comprises nozzle means for producing a jet of gas, means for providing a substantially constant pressure drop through said nozzle means irrespective of the pressure at the output of said nozzle means, means for variably interposing a surface into said jet of gas, sensor means responsive to said partial pressure in said system for adjusting said interposing means, means responsive to said jet for producing an output which varies with said interposing of said surface into said jet, and means responsive to said output for controlling the admission of controlled gas to said system.

4,003,397

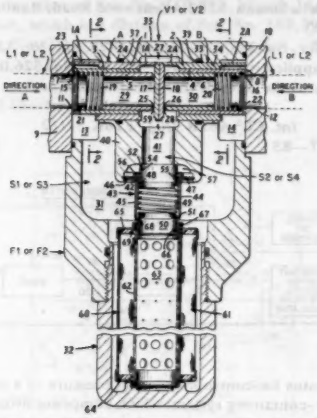
DUAL COAXIAL BIDIRECTIONAL VALVES AND FILTER ASSEMBLIES AND HYDROSTAT SYSTEMS CONTAINING THE SAME

Roydon B. Cooper, Locust Valley, N.Y., assignor to Pall Corporation, Glen Cove, N.Y.

Division of Ser. No. 519,732, Oct. 31, 1974, Pat. No. 3,985,652, which is a continuation-in-part of Ser. No. 356,231, May 1, 1973, Pat. No. 3,908,693. This application May 16, 1975, Ser. No. 578,432
Int. Cl.² F16K *15/00*
U.S. Cl. 137—493.9 **13 Claims**

1. A dual coaxial valve responsive to fluid pressure arising from flow of fluid in either direction through one fluid line to direct flow in the same direction in another fluid line, comprising, in combination, a tubular valve housing, first and second valves in the housing, each having first and second coaxial inner and outer tubular valve elements, nested concentrically and separately reciprocable within the valve housing towards and away from first and second valve seats, respectively, between closed and open positions, to close and open first and second flow passages, respectively; one of the first and second valve elements of each valve controlling flow in one direction through one flow passage and the other valve elements of each valve controlling flow in another direction through the other flow passage; bias means urging the valve elements in one direction; and a fluid-pressure-receiving surface operatively connected to each valve element, urging the first valve element in a first direction with respect to its valve seat, and the

second valve element in a second direction with respect to its valve seat; the biasing force of the bias means being adjusted to resist movement of each valve element in said direction with respect to its valve seat under differential fluid pressure arising from flow from one direction and applied to the fluid-pressure receiving surface and the valve element moving in said direction with respect to its valve seat and opening when flow begins from that direction, one of the valve elements of the first valve and one of the valve elements of the second valve being responsive to fluid pressure arising from flow in one direction from one side of the valve, and the other of the valve elements of the first valve and the other of the valve



elements of the second valve being responsive to fluid pressure arising from flow in another direction from the other side of the valve, so that the valve is arranged to move in one direction between open and closed positions in response to fluid pressure arising from flow and applied from either direction of flow, and to direct flow entering the valve from the one fluid line from either direction to one of the first and second flow passages, and to direct flow leaving the valve via the other of the flow passages to the one fluid line for flow in either direction, while proceeding in the same direction through the fluid lines in fluid flow connection with the first and second flow passages.

4,003,398

PRESSURE LIMITER DEVICE

Francois Duveau, 74 Rue de Normandie, Courbevoie, France (92400)

Filed Mar. 17, 1975, Ser. No. 558,957

Claims priority, application France, Jan. 21, 1974, 74.09653

Int. Cl.² F16K *15/14*

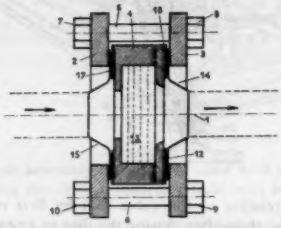
U.S. Cl. 137—512 **12 Claims**

1. A fluid pressure limiting device comprising: an elastically-operable obturator, said obturator including:

a plurality of valve members formed of elastomeric material and having at least one slit formed therein, said valve members being serially arranged and having opposed facing surfaces, said valve member slits defining normally closed pressure responsive valves; and

a shim comprised of a material having a low coefficient of friction interposed between and in contact with the facing surfaces of each pair of adjacent elastomeric valve members, said shim having an opening formed therein, the opening in said shim defining a permanently open fluid flow passage, said shim determining the spacing between pairs of adjacent elastomeric valve members and facilitating relative sliding motion between contacting surfaces of said shim and valve members; and

means for assembling said valve members and shim in a stack whereby a sliding action of facing surfaces of said



valve members during pressure introduced distortion thereof may occur.

4,003,399

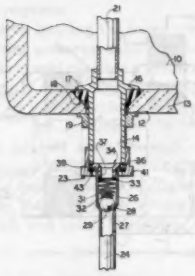
ANTI-SYPHON DEVICE FOR A WATER SUPPLY LINE

Edward J. Fischer, 630 Queen City Ave., Crescent Springs, Ky. 41011

Filed Feb. 25, 1975, Ser. No. 552,934

Int. Cl.² F16K *15/04;* **E03D** *11/00*

U.S. Cl. 137—592 **4 Claims**

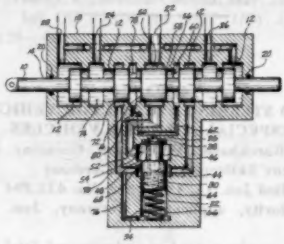


1. In combination with a toilet tank having an opening in a bottom wall thereof, a tubular inlet fitting mounted in the opening and having a lower portion extending downwardly from the bottom wall, a one-piece water supply line underlying the inlet fitting, the water supply line including a main portion, a head portion of enlarged diameter, and an outwardly extending flange at an upper end of the head portion, a washer member forming a seal between the flange of the water supply line and the lower portion of the inlet fitting, the washer member having a portion extending inwardly of the head portion, a lower end section of the head portion of the water supply line extending downwardly and inwardly to the main portion of the water supply line to form a valve seat at the lower end of the head portion, a valve member inside the head portion engageable with the valve seat to form a seal therewith, a compression spring mounted in the head portion and bearing on the valve member and on the inwardly extending portion of the washer member to urge the valve member to closed position, and means mounted on the lower portion of the inlet fitting and bearing on the flange of the water supply line to hold the water supply line and the washer member in assembled relation on the lower portion of the inlet fitting.

4,003,400
SELF-DEPRESSURIZING METERING VALVE

Bernus G. Turner, Renton, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Apr. 7, 1975, Ser. No. 565,901
Int. Cl.² F16H 11/00
U.S. Cl. 137—596 2 Claims



1. A self-depressurizing hydraulic control valve comprising in combination:

a valve body having a plurality of passageways disposed therein, a supply port for receiving high pressure hydraulic fluid and a cylinder port for delivering a metered flow of said fluid;

a metering valve disposed within a main valve cavity within said valve body for controlling the flow of hydraulic fluid through at least one of said passageways;

a metering land located on said metering valve and having a metering edge;

a hydraulically-actuated shutoff valve located in a shutoff valve chamber within said valve body responsive to the rate of said flow for depressurizing the metering edge when the flow rate is reduced to a preselected value, such shutoff valve further having a centrally located orifice permitting the restricted flow of hyraulic fluid therethrough;

means for biasing said shutoff valve toward a closed position; and

means for arming said shutoff valve.

4,003,401
LIQUID OUTLET VALVE

Rolf A. Häring, 86a Hauptstrasse, 4148 Pfeffingen, Switzerland

Filed Mar. 17, 1975, Ser. No. 559,260
Claims priority, application Switzerland, Mar. 28, 1974, 4345/74
Int. Cl.² F16K 31/58
U.S. Cl. 137—599.2 7 Claims

1. A liquid outlet valve connectable to the outlet of a pipe and comprising:

a. a throughhole member having an entry opening, a first outlet opening, a straight-through main passage between said entry opening and said first outlet opening, a second outlet opening and a lateral secondary passage branching off from said main passage and leading to said second outlet opening;

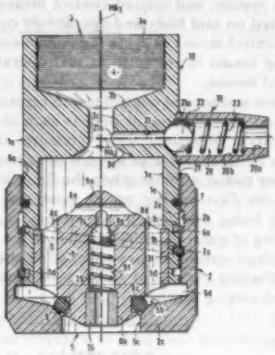
b. a sleeve member surrounding the lower half of said throughhole member, and having annular flange means projecting inwardly outside said first outlet opening of said main passage;

c. sealing means adapted for closing off said first outlet opening when being urged into sealing engagement with said flange means and with the lower part of said sleeve member outside the latter opening; and

d. connecting means for movably connecting said sleeve member with said throughhole member, said connecting means serving to adjust the position of said sleeve member and throughhole member relative to one another, thereby controlling the amount of liquid flowing through said main passage;

e. said throughhole member and said sleeve member having cylindrical surfaces opposite one another and helical grooves of equal pitch but different depth in said cylindrical surfaces to accomodate said connecting means;

f. and said connecting means being a coil spring having the same pitch as said grooves, the thickness of the wire of which coil spring is equal to approximately twice the depth of the flatter one of said two grooves, and further having a bias in radial direction relative to the helix described by said grooves which bias is directed into the flatter one of said grooves;

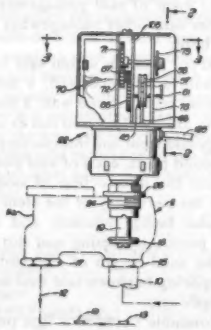


g. the helical groove located in the inner cylindrical surface of said cap merging at the groove end away from said outlet opening with an annular groove in said inner cap surface which latter annular groove is wider in axial direction than said helical groove.

4,003,402
BATTERY OPERATED, FLUID PRESSURE RESPONSIVE VALVE CONTROLLER

Robert F. Corliss, Hacienda Heights, and Frank Wilkinson, Monrovia, both of Calif., assignors to Tyme Valve Corporation, Cerritos, Calif.

Division of Ser. No. 386,395, Aug. 7, 1973, Pat. No. 3,921,667, which is a continuation-in-part of Ser. No. 216,397, Jan. 10, 1972, abandoned. This application Oct. 6, 1975, Ser. No. 620,103
Int. Cl.² F16K 31/36
U.S. Cl. 137—624.18 12 Claims



1. For use in a pressurized liquid supply system including valve bodies through which water flow is to be controlled, the combination comprising

a. a master control unit including a first valving means projecting for installation and movement in a first of said bodies to control water flow to at least one outlet in the system, and first control means adapted to be mounted on said first body and operable to cycle the movement of said first valving means at predetermined time intervals, and

b. an auxiliary control unit including second valving means projecting for installation and movement in a second of said bodies to control water flow to at least another outlet in the system, and second control means adapted to be mounted on said body and operatively connected to said first control means to cycle the movement of said second valving means in response to said operation of the first control means,

c. said first and second control means respectively including first and second actuator pistons each carried to receive application of system water pressure, the first control means being operable to bleed water pressure supplied to the first piston at times when the first piston is cycled to open the first valving means, and the second control means being operable in response to a change in said bleeding of water pressure supplied to the first piston to in turn bleed water pressure supplied to the second piston, for effecting cycling of the second piston to open the second valving means.

4,003,403

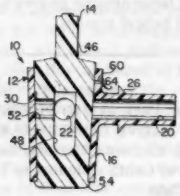
STOPCOCK

John R. Nehring, Woodcliff Lake, N.J., assignor to International Paper Company, New York, N.Y.

Filed June 10, 1974, Ser. No. 477,906

Int. Cl.² F16K *5/02*

U.S. Cl. 137—625.41 **10 Claims**



1. A stopcock comprising:

a. a body having a bore extending axially therethrough, first, second and third passageways extending transversely through said body and intersecting said bore, said second and third passageways being axially spaced from said first passageway, and each of said passageways being angularly spaced from said other passageways about the periphery of said bore;

b. a stem mounted for rotation within said bore, said stem having a side wall, a first end wall, a second end wall spaced axially from said first end wall, a handle on one of said end walls, an axially elongated slot extending radially partially through said stem and intersecting said side wall, and first and second ports, each of said ports being angularly spaced from the intersection of said slot and said side wall about the periphery of the stem, said first and second ports also being angularly and axially spaced apart, and said ports intersecting said slot at the interior of said stem, the axial length of said slot being greater than the axial spacing between said first and said second and third passageways;

said stem being rotatable between a first position wherein said first and second passageways are in fluid flow communication through said slot and said first port and wherein said third passageway is obturated and a second position therein said first and third passageways are in fluid flow communication through said slot and said second port and wherein said second passageway is obturated; and

said stem also being rotatable into a third position wherein said first passageway is obturated, said third position lying angularly between said first and said second positions.

4,003,404

SERVO STEERING SYSTEM FOR VEHICLES, ESPECIALLY MOTOR VEHICLES

Manfred H. Burckhardt, Waiblingen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

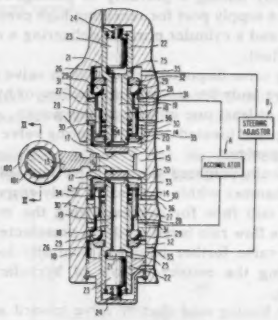
Filed Jan. 11, 1974, Ser. No. 432,594

Claims priority, application Germany, Jan. 12, 1973, 2301415

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² B62D *5/08*

U.S. Cl. 137—627.5 **12 Claims**



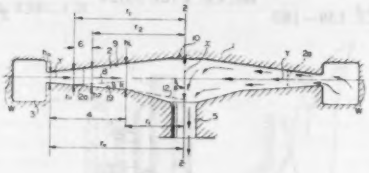
1. A servo-steering system for vehicles in which a steering nut is movable on a steering spindle, and in which adjusting means are coordinated to the steering nut which are acted upon by a pressure medium, whose pressure is controllable by a control means in dependence on the deflection of the steering nut, characterized in that a high pressure accumulator means serves as pressure medium source, said control means being provided with space means conducting the working pressure, the inflow of the pressure medium to said space means being substantially completely interrupted by said control means in the normal position of the steering nut, the steering nut engages with a finger into a guide sleeve means which is located in a bore provided in a portion of the control means between two control piston means, and valve closure plate means in said guide sleeve means which are spaced at a slight distance from the end faces of the control piston means forming valve seats for the valve closure plate means, one control sleeve means each is fixedly arranged in the bore of the portion of said control means on both sides of the guide sleeve means, said control sleeve means accommodating centrally thereof the control piston means and at the end face thereof an inlet valve means leading to said space means conducting the working pressure, several similar axially parallel bores are provided in each control sleeve means, which are connected with the inlet from the accumulator means, said last-mentioned bores being closed in the direction toward the working space means by first valve means and receiving compensating piston means in the direction toward the guide sleeve means, and at least the compensating piston means being supported at abutment means fixedly arranged on the control piston means.

4,003,405

APPARATUS FOR REGULATING THE FLOW RATE OF A FLUID

William F. Hayes; John W. Tanney, both of Ottawa, and Helen G. Tucker, Orleans, all of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Mar. 1, 1976, Ser. No. 662,842
Claims priority, application Canada, Mar. 26, 1975, 223118
Int. Cl.² F15D 1/00, 1/02, 1/04, 1/06
U.S. Cl. 138—40 14 Claims



1. Apparatus for regulating the flow rate of a fluid, comprising;

a. a casing having, when the apparatus is regulating the flow rate of a fluid, a fluid passage which is symmetrical about an axis and is annular shaped when viewed in the direction of the said axis and has a geometry such that any sectional area of the fluid passage which is symmetrical about the said axis and is normal to the mean direction for the flow of fluid therein forms a curved surface within the range of the curved surface of a frustrum of a cone and the curved surface of a circular cyliner, a fluid inlet cavity in the casing, for connection to a source of pressurized fluid, the fluid inlet cavity being coaxial with the annular shaped fluid passage and forming a substantially unobstructed flow path for fluid to the whole of a peripheral inlet area to the annular shaped fluid passage, and fluid outlet means coaxial with the annular shaped fluid passage and spaced radially from the fluid inlet cavity, the fluid outlet means being for the escape of fluid from the fluid passage and forming a substantially unobstructed flow path, from the whole of a peripheral outlet area of the annular shaped fluid passage, for fluid which has flown through the annular shaped fluid passage from the fluid inlet cavity, and wherein,

b. when the apparatus is regulating the flow rate of a fluid, the flow of fluid along the whole length of the fluid passage, and in the mean direction of fluid flow therein, is laminar as evidenced by the fluid passage geometry conforming with the relationships in the following equations designated (1) to (8):

i. for a fluid, having the characteristics of a substantially incompressible, substantially Newtonian fluid, flowing through the fluid passage, if the fluid passage is divided into incremental portions for which the centerline of the fluid passage generally in the mean direction of the fluid flow may be assumed to be substantially straight, then the fluid static pressure drop $(p_2 - p_1)$ in each incremental portion conforms with the following relationship in consistent units:

$$(p_1 - p_2) = \frac{-1.21G^2}{g(2\pi)^2 (\sin\theta)^2 \rho} (A) + \frac{6\mu G (B)}{\pi\rho (\sin\theta)} \quad (1)$$

where A and B are geometric parameters of the incremental portion under consideration and are defined, in consistent units, by the reltionships:

$$A = \frac{k (\sin\theta)}{x^3} \cdot 2 \quad \frac{1}{r_2} - \frac{1}{r_1} \cdot 2 + \frac{(\sin\theta)^2}{2x^2} \cdot 2 \quad \frac{1}{(r_2)^2} - \frac{1}{(r_1)^2} \cdot 2 + \frac{k^2}{x^3} \cdot 2 \quad \frac{1}{h_2} - \frac{1}{h_1} \cdot 2$$

-continued

$$+ \frac{k^2}{2x^2} \cdot 2 \quad \frac{1}{(h_2)^2} - \frac{1}{(h_1)^2} \cdot 2 \quad (2)$$

$$B = \frac{1}{x^3} \ln \cdot 2 \quad \frac{r_2}{r_1} \cdot 2 - \frac{1}{x^3} \ln \cdot 2 \quad \frac{h_2}{h_1} \cdot 2 + \frac{1}{x^2} \cdot 2 \quad \frac{1}{h_2} - \frac{1}{h_1} \cdot 2 + \frac{1}{2x} \cdot 2 \quad \frac{1}{(h_2)^2} - \frac{1}{(h_1)^2} \cdot 2 \quad (3)$$

where $k = \dfrac{\sin\theta\,(h_1 - h_2)}{(r_2 - r_1)}$ (4)

and $x = h_2 \dfrac{r_2}{\sin\theta}$ (5)

and where

r_1 = the radius, of that incremental portion at which p_1 occurs and where the radius is measured from the said axis of symmetry of the fluid passage to a first limit of the centerline of that incremental portion of the fluid passage in the mean direction of flow therealong,

r_2 = the radius of that incremental portion at which p_2 occurs and where the radius is measured from the said axis of symmetry of the fluid passage to a second limit of the centerline of that incremental portion of the fluid passage in the mean direction of fluid flow therealong and downstream of the first limit,

h_1 = the lesser dimension of that incremental portion, transverse to the mean direction of flow of fluid therethrough, at the radius r_1,

h_2 = the lesser dimension of that incremental portion, transverse to the mean direction of flow of fluid therethrough, at the radius r_2,

θ = the slope of the centerline of that incremental portion in the mean direction of fluid flow relative to the said axis of symmetry of the fluid passage, and is in the range greater than 0° and less than 180°,

k = mean slope of one boundary wall of that incremental portion relative to the opposite boundary wall thereto,

x = equivalent height of that incremental portion at the said axis of symmetry of the fluid passage as indicated by projecting the mean slope of each of the fluid passage boundary walls of that incremental portion to the said axis of symmetry,

G = mass flow rate of fluid flowing along the fluid passage,

ρ = density of fluid flowing along the fluid passage,

μ = absolute viscosity of fluid flowing along the fluid passage, and

g = acceleration due to gravity, and

ii. for a fluid, having the characteristics of a substantially compressible, substantially Newtonian fluid, flowing through the fluid passage, if the fluid passage is divided into incremental portions for which the centerline of the fluid passage generally in the mean direction of fluid flow may be assumed to be substantially straight, and where the fluid static pressure in each incremental portion, at any point on the said centerline of the fluid passage in the mean direction of flow of fluid therethrough, is a substantially linear function of the radial distance from the said axis of symmetry of the fluid passage to that point on the said centerline of the fluid passage, then the following relationship exists in consistent units for each incremental portion:

$$\frac{RT}{4} [(p_2)^2 - (p_1)^2] [(r_2)^2 (r_1)^2] = \frac{1.21 (GRT)^2}{g(2\pi)^2} \cdot 2 \quad C + \frac{1}{x^2} \ln \cdot 2 \quad \frac{p_2}{p_1} \cdot 2 \cdot 2 + \frac{6\mu G(RT)^2 (\sin\theta) (D)}{\pi} \quad (6)$$

where C and D are geometric parameters of the inremental portion under consideration and are defined, in consistent units, by the relationships:

$$C = \frac{1}{x^2}\ln .2\ \frac{r_2}{r_1}\ .2 - \frac{2}{x^2}\ln .2\ \frac{h_2}{h_1}\ .2 + \frac{2}{x}\ .2\ \frac{1}{h_2} - \frac{1}{h_1}\ .2 - \frac{1}{2}\ .2\ \frac{1}{(h_2)^2} - \frac{1}{(h_1)^2}\ .2 \quad (7)$$

$$D = \frac{x}{2k^2}\ .2\ \frac{1}{(h_2)^2} - \frac{1}{(h_1)^2}\ .2 - \frac{1}{k^2}\ .2\ \frac{1}{h_2} - \frac{1}{h_1}\ .2 \quad (8)$$

and where similar symbols in the relationships (6), (7) and (8) are as previously defined for the relationships (1), (2) (3), (4) and (5) and where

ln = hyperbolic or natural logarithm,

T = the absolute temperature of fluid flowing along the fluid passage, which with the fluid passages according to the present invention has been found to remain substantially constant along the whole length of the fluid passage, and

R = a constant for the substantially compressible fluid flowing along the fluid passage and is in accordance with the relationship $p/\rho_c = R.T.$ where

p = the absolute static pressure of the fluid at any position along the fluid passage,

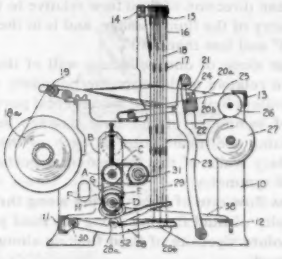
ρ_c = the density of the substantially compressible fluid at the position along the fluid passage where the absolute static pressure p is defined.

4,003,406

CAM LOOM APPARATUS AND METHOD

Edward E. Byrd, 109 Sylvan Road, Greenwood, S.C. 29646

Filed May 27, 1975, Ser. No. 581,105
Int. Cl.² D03C *5/00*
U.S. Cl. 139—80 **14 Claims**



1. For use in a loom having a plurality of harnesses and a plurality of treadles carried longitudinally of the loom beneath the harnesses and connected to respective harnesses for raising and lowering selected harnesses to form sheds, the improvement including:

a driven rotatable shaft;

means mounting said rotatable shaft for rotation at a predetermined speed transversely of said treadles;

a plurality of first sprockets carried on said rotatable shaft in fixed relation thereto so as to be rotated thereby;

a fixed shaft carried adjacent said treadles in alignment with said rotatable shaft;

a plurality of second sprockets carried on said fixed shaft in rotatable relation thereto so as to be rotated thereon in alignment with said first sprockets;

a plurality of cams carried on said fixed shaft in rotatable relation thereto adjacent respective second sprockets and in operating relation to respective treadles;

a plurality of chains driven by respective first sprockets carried by said second sprockets; and

co-acting means carried by respective chains and by respective second sprockets intermittently connecting respective cams in driving relation to said chain in predetermined sequence;

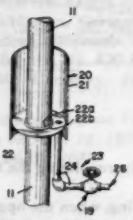
whereby said cams move intermittently to impart intermittent movement to respective treadles in predetermined sequence.

4,003,407

DRIP-PREVENTING CONDENSATION SHROUD USABLE WITH WATER HEATERS

John F. Finger, Beresford, S. Dak., assignor to Sioux Steam Cleaner Corporation, Beresford, S. Dak.

Filed Sept. 20, 1974, Ser. No. 507,921
Int. Cl.² F16L *55/24*
U.S. Cl. 138—103 **2 Claims**



2. A shroud assembly positionable around the inlet pipe of a water heater to retard the formation and dripping of condensate on the inlet pipe, comprising:

a. A sleeve positionable around an inlet pipe;

b. attachment means for securing said sleeve to an inlet pipe, said attachment means including a resilient gripping element supported by said sleeve and forcibly abutable against an inlet pipe which may be inserted within said sleeve to hold said sleeve to an inlet pipe by frictional force;

c. spacing means for positioning said sleeve in a generally vertical orientation about an inlet pipe to allow for the free convection of air between said sleeve and an inlet pipe which may be positioned within the sleeve;

d. said spacing means containing an opening to allow for the free convection of air between said sleeve and an inlet pipe about which said sleeve may be positioned; and

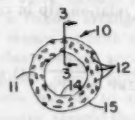
e. a selectively controllable drain valve attached to said spacing means for draining from said spacing means any accumulated condensate which may form within said sleeve, said drain valve being controllably movable from a closed to an open position.

4,003,408

UNDERGROUND IRRIGATION POROUS PIPE

James E. Turner, Southlake, Tex., assignor to George C. Ballas, trustee, Houston, Tex.

Filed Feb. 26, 1974, Ser. No. 445,866
Int. Cl.² F16L *11/04*
U.S. Cl. 138—118 **7 Claims**



1. Irrigation conduit means comprising:

a substantially flexible tubular member formed of a plurality of random sized, random shaped, and random spaced, elastomer bodies, and

a polyethylene binder mix intermixed with said bodies to provide a porous sidewall having a labyrinthine network of irregularly shaped and sized channel-like apertures

closely spaced at random along its length and about its circumference.

4,003,409

ARRANGEMENT FOR OIL SPRAY PUMPS

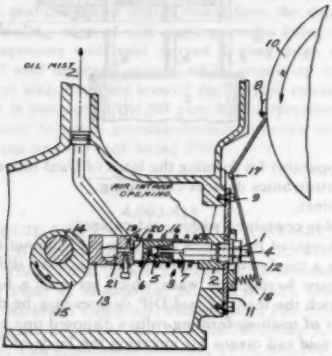
Günter Steffens, Viersen, Germany, assignor to Cramer-Halstrup & Schrunder, Viersen-Helenabrunn, Germany

Filed Feb. 5, 1976, Ser. No. 655,375

Claims priority, application Germany, Feb. 17, 1975, 2506633

Int. Cl.² D03J *1/00*

U.S. Cl. 139—1 R **3 Claims**



1. An oil spraying pump adapted for use with a weaving machine, comprising:

a fixed piston provided with an axially oriented bore-hole which communicates with atmosphere;

a movable cylinder within which said piston is located, said bore-hole opening into the interior of said cylinder;

means for normally sealing said bore-hole;

a follower element located within said bore-hole and having a portion projecting from an end of the piston remote from the cylinder;

means engaging the projecting portion of said follower to periodically displace the follower thereby moving the sealing means from its sealing relationship with the bore-hole whereby the interior of the cylinder is vented to atmosphere;

means for supplying oil to the interior of the cylinder;

a discharge opening from the cylinder interior; and

means for moving said cylinder axially with respect to the piston whereby when said bore-hole is sealed and said cylinder moves towards the piston, air within the cylinder interior is compressed to force oil in a mist from said discharge opening.

4,003,410

SHUTTLE SPRING STABILIZER

Harrison N. Thibault, Hopedale, Mass., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Mar. 18, 1976, Ser. No. 667,896

Int. Cl.² D03J *5/16*

U.S. Cl. 139—207 **3 Claims**

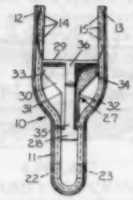
1. A stabilizer for a shuttle spring of the type having a U-shaped shank portion with opposed laterally flexible spring steel gripping jaws for releasably holding a weft bobbin therebetween, said stabilizer comprising:

a. a body portion;

b. a rib member (**28**) forming one end of said body portion having a lateral dimension of a width to be rigidly held by the shank portion;

c. means interconnected with and spaced from said rib member defining the opposite end (**29**) of said body portion having a lateral dimension of greater width than said rib member; and

d. stop surfaces (**33–34**) defining the sides of said opposite



end of said body portion for engaging the gripping jaws at locations intermediate their ends and the shank portion during bobbin replenishment to prevent inward flexing thereof beyond a predetermined position.

4,003,411

DEVICE FOR WITHDRAWING FABRICS FROM LOOMS

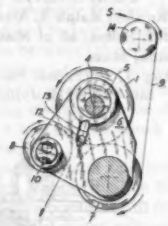
Václav Hŝsek, Trebechovice pod Orebem, Czechoslovakia, assignor to Elitex, Zavody textilniho strojirenstvi generalni reditalstvi, Liberec, Czechoslovakia

Filed May 13, 1974, Ser. No. 469,454

Claims priority, application Czechoslovakia, May 24, 1973, 3742/73

Int. Cl.² D03D *49/20*

U.S. Cl. 139—308 **2 Claims**



1. In a device for withdrawing fabric having a hauling beam journalled for rotation, first and second pressure beams cooperable with the hauling beam, and means including a first eccentric carried on the journals of the hauling beam for supporting one of the pressure beams, the improvement wherein the supporting means comprises a bracket carried by the first eccentric and exhibiting first and second spaced apertures and in which the improvement further comprises, in combination, means supporting the first one of the pressure beams within the first aperture of the bracket, a second eccentric carried in the second aperture of the bracket, and means for supporting the second one of the pressure beams on the second eccentric.

4,003,412

WEFT CARRIER POSITIONING DEVICE

Richard L. Volpe, Hopedale, Mass., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Sept. 23, 1975, Ser. No. 615,996

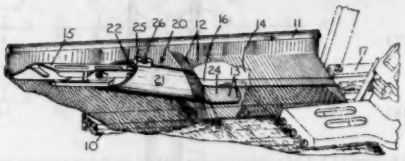
Int. Cl.² D03D *47/00*

U.S. Cl. 139—449 **3 Claims**

1. A device for selectively guiding a weft carrier to an accessible position outside a warp shed in looms of the type in which opposed carriers attached to flexible tapes insert weft yarn from a stationary source of supply within sheds formed by warp threads, said device comprising:

a. means defining an elongated hollow body insertable for a portion of its length between an adjacent pair of warp threads of the upper warp sheet;

b. a camming means forming one end of said elongated hollow body for displacing warp threads of the upper warp sheet during insertion of said hollow body; and



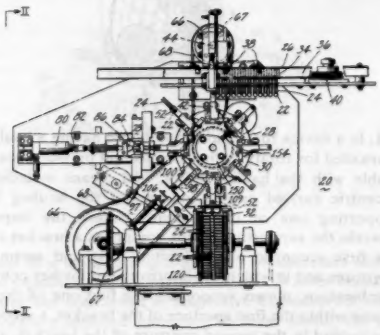
c. means extending from said one end of said elongated hollow body for locating the latter in operative association with a plurality of warp threads of the lower warp sheet and in the pathway of the weft carrier.

4,003,413

MACHINES FOR REFORMING AND REPACKAGING COMPONENTS

Waldo B. Hanson, Rowley; Ralph A. Morrison, Topsfield, and Armand L. Tardiff, Salem, all of Mass., assignors to USM Corporation, Boston, Mass.

Filed Aug. 1, 1975, Ser. No. 600,963
Int. Cl.² B21F *45/00*
U.S. Cl. 140—1 **14 Claims**



1. A machine for processing components having generally parallel leads extending from one side of their bodies, respectively, comprising:

conveyor means movable from a loading station, through successive processing stations, to an unloading zone;

uniformly spaced lead grippers mounted on said conveyor means for controlling portions of the leads adjacent to their respective bodies;

means on at least one subsequent station for cooperating with said grippers to bend the distal ends of said leads carried thereby into coaxial relation with one another and substantially at right angles with respect to their proximal ends which comprise said components' standoff lengths;

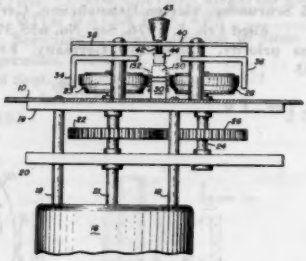
a lead taping mechanism, and means for transferring the successive formed components from the conveyor grippers with their coaxial lead portions in position to be taped by the lead taping mechanism.

4,003,414

DIP LEAD FORMER

Dewey D. Halligan, 6251 Empress Court, San Jose, Calif. 95129

Filed Feb. 20, 1976, Ser. No. 659,766
Int. Cl.² B21F *1/02*
U.S. Cl. 140—1 **11 Claims**



1. Apparatus for forming the leads of Dual-Inline-Packaged (DIP) electronics devices comprising:

a cabinet;

a motor contained within said cabinet;

an elongated rail means affixed to said cabinet and providing a track over which DIP devices may slide, said rail means having side walls which serve as a form against which the leads of said DIP devices may be deformed;

a pair of resilient forming rollers disposed one on each side of said rail means for engaging the leads of DIP devices sliding along said rail means and pressing the leads against said side walls;

means driveably connecting said motor to said rollers; and

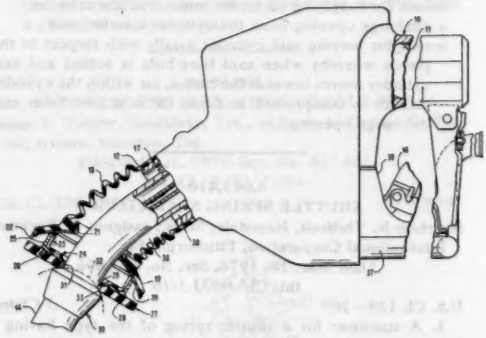
guide means disposed above said rail means and spaced therefrom sufficient to permit a DIP device to pass therebetween.

4,003,415

LIQUID DISPENSING NOZZLE HAVING VAPOR RECOVERY AND SEALING ARRANGEMENT

Donald A. Lasater, Fairfield, Ohio, assignor to Dover Corporation, New York, N.Y.

Filed May 29, 1975, Ser. No. 581,718
Int. Cl.² B67C *3/34*; B65B *31/06*
U.S. Cl. 141—59 **30 Claims**



1. A liquid dispensing nozzle having a body, a spout extending from said body and having its free end for disposition in an opening of a fill pipe of a vehicle tank or the like, means to return vapor from the tank being filled, said vapor return means having sealing means associated therewith to form a seal between the fill pipe opening and said vapor return means when said spout is disposed in the fill pipe, said sealing means having a sealing edge thereon, said sealing edge having an

arcuate perimeter, means continuously urging said sealing means toward the free end of said spout, said spout having means disposed thereon between the free end of said spout and said sealing edge of said sealing means, said disposed means having a sealing edge engaging surface on its end adjacent said sealing edge of said sealing means, said sealing edge engaging surface having a section which is curved to have an arcuate perimeter complementary to the arcuate perimeter of said sealing edge and located on said disposed means to engage said sealing edge of said sealing means over essentially the entire perimeter of said sealing edge irrespective of the angular relation of said sealing edge of said sealing means to the longitudinal axis of said spout to form an essentially leakproof seal therebetween when said spout is not disposed in the fill pipe to seal said vapor return means from the atmosphere, and said sealing edge of said sealing means being removed from engagement with said curved sealing edge engaging surface of said disposed means while remaining in sealing engagement with a surface around the fill pipe opening when said spout is inserted in the fill pipe by compression of said urging means to cause communication between said vapor return means and the tank being filled.

4,003,416

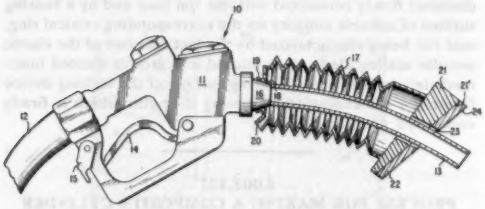
LIQUID-DISPENSING NOZZLE ASSEMBLY

Bernard E. Weidenaar, Hacienda Heights, Calif.; Frederick L. Voelz, Orland Park; James J. Simnick, Riverdale, both of Ill., and Peter P. Moskovich, Jr., Gary, Ind., assignors to Atlantic Richfield Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 468,787, May 9, 1974, abandoned. This application Mar. 31, 1975, Ser. No. 563,879

Int. Cl.² B65B *3/04*

U.S. Cl. 141—392 **13 Claims**



1. A liquid dispensing nozzle assembly for delivery of liquid from a liquid source to a liquid receiver having a receiver inlet, said assembly being provided with means to allow for the removal of vapor during delivery of liquid to said receiver inlet from said source, said nozzle assembly comprising:

1. a liquid dispensing nozzle having a nozzle inlet, a nozzle housing and an elongated discharge spout adapted for insertion into said receiver inlet;
2. a vapor collector surrounding, in spaced relation thereto and forming a chamber therearound, the upper portion of said spout nearest said nozzle housing, said chamber being in fluid communication with the receiver inlet when said nozzle is inserted into said liquid receiver, one end of said vapor collector being sealed to said nozzle housing, or in proximity thereto, a sealant means carried by the other end of said vapor collector and having an exposed face for forming a surface seal against the outer surface of said receiver inlet, said spout extending beyond the other end of said sealant means; and
3. means for allowing removal of vapor from said chamber; the improvement comprising said sealant means comprising a compressible cellular plastic material obtained from a fluorine-containing elastomer, said material having:

a. a plurality of cells present as part of its structure;
b. compressibility under normal nozzle loads of the material in contact with the outer surface of the receiver inlet in the range of from about 5 to about 85% of that part of the material's original preload volume;
c. substantial resistance to the liquid dispensed and vapor being removed; and
d. the ability to form a seal against the outer surface of said receiver inlet and reduce the amount of vapor escaping to the atmosphere during liquid dispensing when said spout is inserted into and said exposed face contacts the outer surface of said receiver inlet.

4,003,417

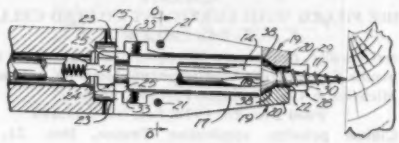
SELF LOCKING AND UNLOCKING CLAMP FOR AUTOMATIC FASTENER DRIVING TOOLS

Leroy Cornwell, E. 6105 Mansfield, Spokane, Wash. 99211

Filed July 28, 1975, Ser. No. 599,674

Int. Cl.² B25B *23/10*

U.S. Cl. 144—32 R **8 Claims**



1. A self locking and unlocking fastener clamp assembly for automatic fastener driving tools, comprising:

a fastener receiving head adapted to be mounted to a forward end of an automatic fastener driving tool;
chuck means mounted to said fastener receiving head and movable thereon between (a) a first position for engaging and securely holding a fastener to be operated on by the driving tool and (b) a second position for releasing the fastener following operation of the driving tool;
locking means for locking the chuck means in said first position;
trigger means associated with said locking means for unlocking the chuck means from the first position; and
fastener release means responsive to forward movement of the fastener along its center axis relative to said chuck means for spreading said chuck means when unlocked from said first position to said second position to release the fastener held thereby;
said chuck means comprising:
a pair of jaw members pivotably mounted to said fastener receiving head on opposite sides of said fastener receiving head;
facing jaw surfaces at forward ends of said jaw members;
facing locking dogs at rearward ends of said jaw members for operative engagement with said locking means;
said jaw surfaces and locking dogs being spaced longitudinally on opposite sides of the pivot axes of said jaw members; and
biasing means interconnecting said jaw members and said fastener receiving housing for normally urging said jaw surfaces together.

4,003,418

COMBINATION TOOL

Allan Andersson, Kjellbergsgatan 6, 41132 Goteborg, Sweden

Filed Sept. 12, 1975, Ser. No. 612,722

Claims priority, application Sweden, Sept. 16, 1974, 7411615

Int. Cl.² B25B *15/02*

U.S. Cl. 145—50 C **2 Claims**

1. A combination tool comprising a ball-shaped handle member and at least three substantially straight work-engag-

ing members projecting substantially radially from said ball-shaped handle member, the tips of said work-engaging members defining a plane spaced from the surface of said handle member.

4,003,419

TIRE FILLED WITH LUBRICANT COATED CELLULAR PARTICLES

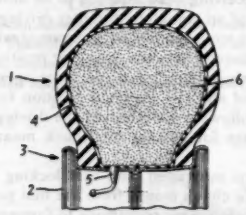
Henri Verdier, Beauregard-l'Eveque, France, assignor to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie, Clermont-Ferrand, France

Filed Dec. 23, 1974, Ser. No. 535,699

Claims priority, application France, Dec. 21, 1973, 73.46442

Int. Cl.² B60C *17/00, 21/08, 1/00*

U.S. Cl. 152—312 **24 Claims**



1. A tire mounted on a wheel rim so as to form a tire cavity which can be inflated with a gas under pressure, characterized by the fact that the tire cavity is filled at least partially with solid light-weight discrete particles of cellular material having a very low apparent density of less than about 100 g./dm³ but resistant to stresses due to tire travel, said particles bearing a lubricant which is inert with respect to the materials present in the tire cavity, thus, the particles are free to move relative to one another, with low friction and low generation of heat when they have to cushion the tire after a puncture of the tire cavity and plug the puncture hole.

4,003,420

TIRE WITH SIDEWALL COMPOSITION

Paul H. Sandstrom, Tallmadge, and Joginder Lal, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Dec. 19, 1975, Ser. No. 642,274

Int. Cl.² C08F *15/06*; C08G *20/20*

U.S. Cl. 152—355 **13 Claims**

1. A pneumatic rubber tire which comprises a generally toroidal shaped carcass with a circumferential tread, shaped beads and connecting sidewall portions extending between said tread and beads and having adhered to said sidewall portion an adherent, covulcanized outer rubbery sidewall layer extending from the general area of said bead portion towards said tread, where said rubbery sidewall layer is an elastomeric composition comprised of (A) 20–40 phr rubbery EPDM, (B) 2–20 phr of a rubbery polymer prepared from at least one C_4-C_{10} α-olefin interpolymerized with at least one C_5-C_{30} nonconjugated polyene containing 2 or more carbon to carbon bonds, and (C) 55–78 phr of high unsaturation rubbers comprised of 30 to 80 weight percent natural rubber.

4,003,421

VEHICLE WHEELS

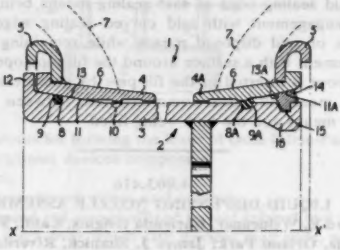
Daniel Lejeune, Clermont-Ferrand, France, assignor to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie, Clermont-Ferrand, France

Filed Nov. 26, 1975, Ser. No. 635,307

Claims priority, application France, Dec. 3, 1974, 74.40197

Int. Cl.² B60C *5/16*

U.S. Cl. 152—409 **2 Claims**



1. Rim for tubeless tires having a rim base with two grooves each supporting an elastic annular sealing element, two conical rings with corresponding flanges and two locking devices for said conical rings, one of said devices being formed by a conical bearing surface forming a thickening of increasing diameter firmly connected with the rim base and by a bearing surface of suitable conicity on the corresponding conical ring, said rim being characterized by the fact that one of the elastic annular sealing elements is housed in a groove located intermediately in the conical bearing surface of the locking device forming a thickening of increasing diameter which is firmly connected with the rim base.

4,003,422

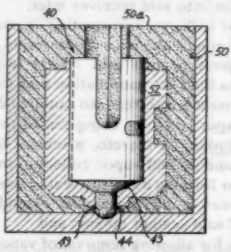
PROCESS FOR MAKING A COMPOSITE CYLINDER HEAD ASSEMBLY

Buford J. Schramm, 1330 E. Fremont Drive, Tempe, Ariz. 85281, and Robert G. Everts, 2118 E. Birchwood Ave., Mesa, Ariz. 85204

Filed Apr. 21, 1975, Ser. No. 570,032

Int. Cl.² B22C *9/10*; B22D *19/08*

U.S. Cl. 164—9 **1 Claim**



1. A process for making a composite cylinder head assembly comprising:

a. forming a cylinder liner sleeve with a circularly cylindrical bore and a plurality of ports extending between an inner wall and an outer wall thereof;

b. forming a core of reducible material filling said bore, and

at least some of said ports, and including at least one body lying against the outer wall and overlaying at least one of said ports, said core being continuous and unitary, and adapted to exclude molten casting metal from the volume it occupies, said core and sleeve comprising an intermediate structure;

c. placing said intermediate structure in a mold, said mold having an inside contour shaped to form a cylinder head surrounding said intermediate structure;

d. filling the spacing between the intermediate structure and mold with molten metal, cooling the metal and removing the mold; and

e. reducing the core and removing the material, whereby to form a cylinder head assembly with a clear bore, open ports, and at least one passage communicating with a port and extending axially alongside the outer wall of the sleeve.

4,003,423

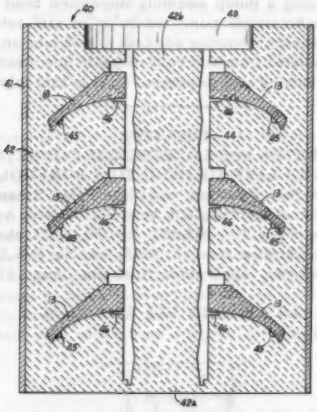
METHODS AND MEANS FOR MAKING DENTAL CASTINGS AND THE LIKE

Tadaomi J. Shikinai, Tokyo, Japan, and Robert A. Horton, Chesterland, Ohio, assignors to Precision Metalsmiths, Inc., Cleveland, Ohio

Filed June 9, 1975, Ser. No. 585,068

Int. Cl.² B22C *9/02, 7/04, 7/00*

U.S. Cl. 164—34 **14 Claims**



1. A method of making a plurality of dental castings in a single mold by the lost pattern process of investment casting comprising the steps of:

a. fitting together in end-to-end relation a plurality of annular segments so as to form a cylindrical support member having outwardly extending, spaced protrusions,

b. forming patterns of dental castings on refractory casts of anatomical form,

c. placing said casts on said protrusions,

d. connecting said patterns to said support member to provide gating structure,

e. forming a mold around said casts, patterns, gating structure and support member,

f. thereafter removing said patterns, gating structure and support member from the mold, and

g. filling the mold with metal to form dental castings on said refractory casts.

4,003,424

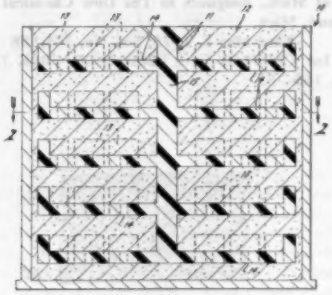
METHOD OF MAKING DUCTILE IRON TREATING AGENTS

Adolf Hetke, Livonia; Prem P. Mohla, Plymouth, and Robert J. Warrick, Ann Arbor, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Nov. 10, 1975, Ser. No. 630,569

Int. Cl.² B22C *9/04;* **B22D** *21/00, 25/02*

U.S. Cl. 164—34 **5 Claims**



1. A method of making a metal treating agent casting, comprising:

a. providing a fugitive pattern for sand casting comprised entirely of a material effective to be gasified upon contact by the molten treating agent, said pattern being configured to define a block having a constant erodible interface with molten metal to be treated and having a volume/surface ratio no greater than 1.5,

b. suspending one or more of said patterns in a molding flask and introducing vibrated selected heat absorbing unbonded particles therearound, said particles being selected from the group consisting of silica sand, zircon sand, chromite sand, carbon sand, and steel shot, and

c. introducing a molten treating agent to displace each of said patterns and allowing said treating agent to solidify at rates to avoid noticeable segregation in the resulting casting greater than 0.75% by weight.

4,003,425

METHOD OF AND MEANS FOR OBTAINING WHITE CAST IRON

William Robert Middleton, Harrogate, England, assignor to The British Cast Iron Research Assoc., Birmingham, England

Filed Feb. 10, 1976, Ser. No. 656,961

Claims priority, application United Kingdom, Feb. 11, 1975, 5699/75

Int. Cl.² B22D *27/18, 27/20*

U.S. Cl. 164—58 **10 Claims**

1. A method of making an iron casting containing at least a region of white iron comprising pouring molten iron into a mold having an internal surface of which at least a portion has first been coated with a material containing a white-iron-promoting material selected from the class consisting of tellurium and bismuth and compounds thereof and containing in addition a substance which contains water in a loosely chemically combined form, said water being bound sufficiently tightly to withstand drying of said mold but being liberated at the temperature of the molten iron.

7. A mold for making an iron casting containing at least a region of white iron, said mold comprising a body defining a mold cavity, at least a portion of the surface of said cavity being coated with a material containing a white-iron-promoting material selected from the class consisting of tellurium and bismuth and compounds thereof and containing in addition a substance which contains water in chemically loosely com-

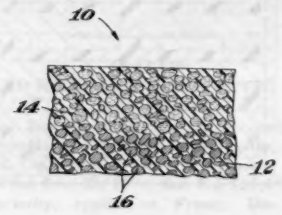
bined form, said water being bound sufficiently tightly to withstand drying of said mold but being such as to be liberated at the temperature of the molten iron.

4,003,426

HEAT OR THERMAL ENERGY STORAGE STRUCTURE

John S. Best, Freeport, and William J. McMillan, Midland, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 8, 1975, Ser. No. 575,558
Int. Cl.² F24D 5/10; F28D 13/00; C09K 5/00
U.S. Cl. 165—53 14 Claims



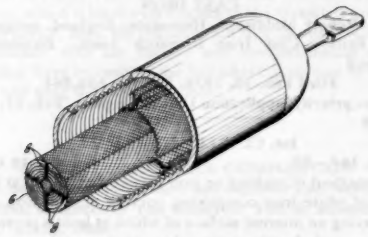
1. A heat or thermal energy storage structure comprising a crosslinked polymeric resinous matrix having a plurality of substantially unconnected small closed cavities disposed therein and a heat sink material encapsulated within said cavities, said heat sink material having a relatively large latent heat capacity at its melting and freezing phase change which supplies heat to or removes heat from said storage structure.

4,003,427

HEAT PIPE FABRICATION

Sidney Leinoff, Plainview; Frederick Edelstein, Hauppauge, and Walter Combs, Freeport, all of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Oct. 15, 1974, Ser. No. 514,923
Int. Cl.² F28D 15/00
U.S. Cl. 165—105 4 Claims



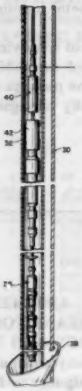
1. In a heat pipe having a closed casing, a wall capillary with a vaporizable liquid carried therein, and an axially disposed artery, the improvement which comprises a spirally wound supported artery having at least two wire mesh layers, said wire mesh layers being arranged so that the warp and weave of said wire mesh are at about a 45° angle with respect to the longitudinal axis of said artery, said wire mesh layers being spaced from one another by a plurality of strips of wire mesh spacers that are arranged so that the warp and weave of said strips of wire mesh spacers are substantially parallel to the warp and weave of the wire mesh of said spirally wound supported artery.

4,003,428

APPARATUS AND METHOD FOR UNDERWATER PUMP INSTALLATION

James N. Zehren, Bartlesville, Okla., assignor to TRW Inc., Cleveland, Ohio

Filed Sept. 19, 1975, Ser. No. 615,100
Int. Cl.² E21B 7/12
U.S. Cl. 166—.5 21 Claims



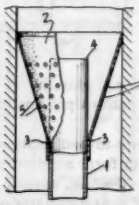
1. Underwater wellhead apparatus comprising a tube having means for supporting the same upright above and in communication with a well bore extending below a body of water, means including a pump assembly suspension head for suspending a submergible pump assembly in said tube at an operating position, a housing adjacent to said tube and having its interior isolated from said body of water, and means in said housing for locking said suspension head in said tube.

4,003,429

APPARATUS FOR LOADING GAS-CONVEYED PARTICULATE SOLIDS INTO A BOREHOLE

David Gilbert Hay, Balaclava, and Richard Fox, Rosanna, both of Australia, assignors to ICI Australia Limited, Australia

Continuation of Ser. No. 383,551, July 30, 1973, abandoned. This application June 12, 1975, Ser. No. 586,341
Claims priority, application Australia, Aug. 17, 1972, 127/72
Int. Cl.² E02D 7/24; E21B 43/08
U.S. Cl. 166—51 4 Claims



1. A device for loading gas conveyed particulate solid into a borehole partially filled with liquid comprising a tube for conveying said solid, mantle means for separating said solid from said liquid and said gas, said mantle means being resistant to inversion and mounted adjacent the discharge end of said tube and coaxially therewith wherein said mantle means further includes perforated and unperforated portions and said mounting is such that said perforated portion is in contact with said tube and said unperforated portion is in contact with

said borehole and at least a part of said perforated portion having perforations of a size in a mesh range of from 300 to 3000 mesh per square inch and wherein the uperforated portion of said mantle means comprises a truncated cone and the perforated portion of said mantle means comprises a cylinder having perforations therein wherein the cylinder is secured to the tube adjacent the end thereof and the truncated cone is attached to the cylinder so that said liquid and said gas pass out of the borehole through said cylinder.

4,003,430

APPARATUS FOR THE REPLACEMENT OF SEALS IN A WELL RAM TYPE BLOW OUT PREVENTER

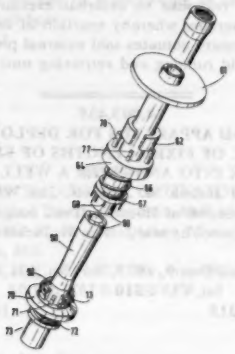
David A. Carnahan, Garricks House, Hampton Court Road, Hampton, Middlesex, England

Filed Dec. 26, 1974, Ser. No. 536,312

Claims priority, application United Kingdom, Jan. 2, 1974, 134/74

Int. Cl.² E21B *33/06*

U.S. Cl. 166—85 **10 Claims**



1. Apparatus to be suspended from the lower end of a drill pipe string for indexing and mounting a blow out preventer receiving shoe on a blow out preventer ram, such apparatus comprising an installation body adapted to be secured to the lower end of the drill pipe string, means for supporting a replacement shoe in a predetermined position on the body, means carried by the installatin body for indexing the shoe support means relative to a drill pipe ram grip during used of the apparatus by being received between the ends of the rams of a partly open drill pipe grip, and means for engaging the replacement shoe with a blow out preventer ram.

4,003,431

PROCESS OF CEMENTING WELLS

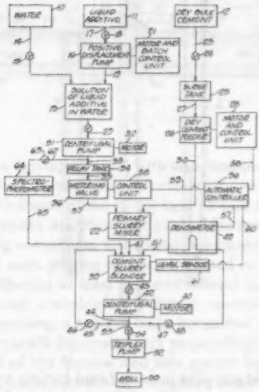
Rudolf J. Novotny, and Charles L. Smith, both of Arlington, Tex., assignors to Byron Jackson, Inc., Long Beach, Calif.

Filed Sept. 20, 1972, Ser. No. 290,610

Int. Cl.² E21B *33/13*

U.S. Cl. 166—250 **8 Claims**

1. A method of cementing at a given location in a well which comprises: introducing a stream of water into a first mixing zone at a controlled rate, concurrently introducing a stream of cement-modifying additive into said first mixing zone at a controlled rate, commingling said stream of water and said stream of additive in said first mixing zone to form an additive-water mixture, flowing a stream of said additive-water mixture to a second mixing zone, introducing said stream of additive-water mixture into said second mixing zone at a controlled rate, concurrently introducing a stream of dry cement ingredients into said second mixing zone at a controlled rate, mixing said stream of additive-water mixture with said stream of cement ingredients in said second mixing zone to form a primary cement slurry, withdrawing a stream of sample of said additive-water mixture from the stream thereof flowing from said first mixing zone to said second mixing zone, continuously determining the concentration of said additive in said stream of sample, controlling the rate at which said stream of cement-modifying additive is introduced into said first mixing zone responsive to said continuously determined concentration, introducing a stream of said primary cement slurry into a cement slurry blending zone and thoroughly mixing said slurry



therein to provide a reservoir of blended cement slurry, continuously measuring the concentration of dry cement ingredients in said blended cement slurry, controlling the rate at which said stream of dry cement ingredients is introduced into said second mixing zone responsive to said continuously measured concentration of dry cement ingredients, pumping said blended cement slurry from said cement slurry blending zone into said given location, and allowing said cement slurry to set in said given location.

4,003,432

METHOD OF RECOVERY OF BITUMEN FROM TAR SAND FORMATIONS

Peter L. Paull, Weston, and Fontaine C. Armistead, Darien, both of Conn., assignors to Texaco Development Corporation, New York, N.Y.

Filed May 16, 1975, Ser. No. 578,243

Int. Cl.² E21B *43/22*, *43/24*, *43/26*

U.S. Cl. 166—271 **12 Claims**

1. A method for fracturing a tar sand formation penetrated by an injection well and a production well consisting of

a. forcing a first fluid down the injection well under sufficient pressure to fracture the formation between the injection well and the production well and

b. circulating a second fluid in the fracture between the injection well and the production well at a temperature below the original temperature of the tar sand formation.

4,003,433

METHOD FOR CUTTING PIPE

Mack Goins, 577 Contour Dr., Lake Charles, La. 70601

Division of Ser. No. 521,473, Nov. 6, 1974, Pat. No. 3,902,070. This application May 12, 1975, Ser. No. 576,727

Int. Cl.² E21B *29/00*

U.S. Cl. 166—298 **7 Claims**

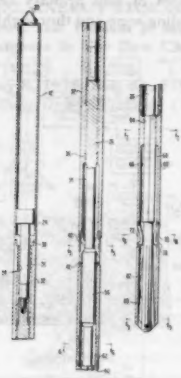
1. A method for cutting a pipe internally comprising:

providing a pipe cutter including an elongated sleeve having a lower, rotatable section and an upper, enclosed, cylinder section housing a piston, said sleeve carrying movable gripping jaws at the central portion thereof, and a cutting tool at the lower rotatable section, said sleeve also carry-

ing a shaft axially movable therein, the upper end thereof coupled to said piston;

disposing said pipe cutter within a pipe to be cut;

displacing said shaft in an axial direction relative to said sleeve by displacing said piston within said cylinder;



displacing said gripping jaws and said cutting tool outwardly laterally in response to axial movement of said shaft to grip the interior pipe wall and engage said wall, respectively, as said piston is displaced within said cylinder; and

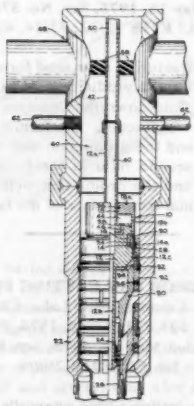
rotating the lower section of said sleeve and said cutting tool relative to the upper portion of said sleeve in response to axial displacement of said shaft to cut said pipe.

4,003,434

METHOD AND APPARATUS FOR RUNNING, OPERATING, AND RETRIEVING SUBSEA WELL EQUIPMENT

Michael R. Garrett, and Michael J. Krenek, both of Houston, Tex., assignors to FMC Corporation, San Jose, Calif.

Filed July 25, 1975, Ser. No. 599,141
Int. Cl.² E21B *23/00, 23/04*
U.S. Cl. 166—315 **8 Claims**



1. A method of releasing a running and retrieving tool connected to a pipe string from a well tool located in a well below a blowout preventer system, said well having a wellhead and at least one choke and kill line extending from said wellhead to a control station, comprising

a. closing the blowout preventer system around the pipe string,

b. conducting hydraulic pressure through the choke and kill line into the well to pressurize the well annulus below the blowout preventer system, and

c. exerting the choke and kill line hydraulic pressure in the well annulus against pressure-responsive means on the running and retrieving tool to disengage said means from said well tool, thereby releasing said running and retrieving tool from said well tool for withdrawal by said pipe string from said well.

4. A hydraulically actuated running and retrieving tool for use in running and retrieving well tools into and from a remotely located wellhead, said running and retrieving tool comprising

a. a body,

b. means on the body for attaching the tool to a drill pipe string, and

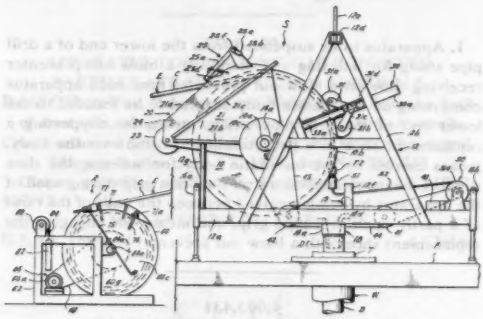
c. means on the body for releasably connecting the running and retrieving tool to a well tool, said connecting means comprising external piston means mounted on the exterior of said body and linearly movable with respect thereto in response to external exertion of hydraulic pressure thereon, whereby exertion of said external hydraulic pressure actuates said external piston means and releases said running and retrieving tool from said well tool.

4,003,435

METHOD AND APPARATUS FOR DEPLOYMENT AND RETRIEVAL OF FIXED LENGTHS OF ELECTRICAL CABLE INTO AND FROM A WELL BORE

Roy H. Cullen; Joshua M. Jackson; Jim Witovek, Jr., and Terry V. Jones, all of Houston, Tex., assignors to General Electric Company, by said Joshua M. Jackson and Jim Witovak, Jr.

Filed Oct. 9, 1975, Ser. No. 621,131
Int. Cl.² E21B *23/00, 19/08*
U.S. Cl. 166—315 **20 Claims**



1. An apparatus for handling fixed lengths of one or more sections of electrical cable having substantially rigid terminal electrical connectors at the end of each cable conductor section for the deployment and retrieval of the entire fixed length of the cable section into and from a well bore, said apparatus comprising, in combination:

a rig floor assembly adapted for positioning over the well bore including means for substantially tangentially feeding and withdrawing the entire length of each electrical cable section into and from the well bore, and means for preventing excessive bending of one of the cable terminal connectors and the cable conductor at an interface between the conductor and the connector of each cable section with the electrical cable being fed into or withdrawn from the well bore; and

an apparatus for supplying and receiving a fixed length of at least one electrical cable section to and from said rig floor assembly for said feeding and withdrawing into and from

the well bore, said apparatus including a reel for winding and unwinding the section of electrical cable having means for preventing excessive bending of at least one of the terminal connectors and the cable conductor of the cable section at an interface between said conductor and said terminal connector with said section of cable being wound or unwound to or from said reel.

14. A method for alternately installing and removing into and from a well bore an entire fixed length of one or more sections of an electrical cable having substantially rigid terminal connectors at the ends of each cable conductor section to transport electrical energy between the surface and a subsurface location in the well bore, said method comprising:

alternately feeding or withdrawing the entire fixed length of a section of electrical cable into and from the well bore from or to a location remote to the well bore; and

supporting and arcuately moving one of the rigid cable terminal connectors while preventing excessive bending of said supported rigid terminal connector and the electrical cable conductor at an interface between the conductor and supported connector with the section of electrical cable being substantially disposed within the well bore during said feeding or withdrawing of the cable into or from the well bore.

4,003,436

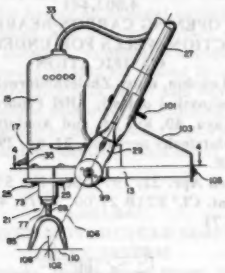
OSCILLATORY CULTIVATOR

Philip C. Foster, and Bert E. Forsman, both of Seattle, Wash., assignors to The Black and Decker Manufacturing Company, Towson, Md.

Filed Aug. 15, 1973, Ser. No. 388,498

Int. Cl.² A01B *33/06*

U.S. Cl. 172—41 **1 Claim**



1. A portable, power operated cultivator comprising a frame, a motor mounted on said frame substantially centrally of its width, said motor having a vertically disposed, rotatable output shaft, a pair of cultivator tines suspended from said frame for oscillation about generally vertical axes, one on either side of said motor, gear train means interconnecting said motor output shaft and said oscillating tines, said gear train means including a pair of oppositely rotating gear elements, each of said gear elements including a drive means eccentrically disposed relative to the axis of said gear element, a pair of means each including a connecting rod engaged with one of said eccentric drive means and also connected to a respective one of said cultivator tines, said connecting rods being substantially symmetrical with respect to a midplane of said frame and operating substantially in opposite directions to one another, whereby the forces developed by said cultivator are substantially equal and opposite to one another thereby cancelling each other and minimizing vibrational forces arising therein.

4,003,437

SOIL CULTIVATING IMPLEMENTS

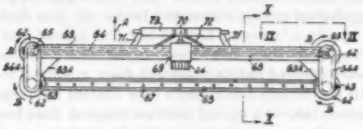
Ary van der Lely, 10, Weverskade, Maasland, Netherlands

Division of Ser. No. 56,048, June 24, 1970, abandoned. This application July 13, 1972, Ser. No. 271,512

Claims priority, application Netherlands, Mar. 30, 1967, 6704508

Int. Cl.² A01B *33/02*

U.S. Cl. 172—59 **3 Claims**



1. A harrow having a frame with coupling means for attachment to a prime mover, and at least one movable tined member mounted on said frame to the rear of said coupling means with respect to the direction of travel of the harrow, said tined member being movable in horizontal directions about substantially vertical axes, driving means supported on said frame and connected adjacent at least one end of said tined member to move same and crumble soil during operation, said tined member comprising a substantially horizontal elongated support, which extends approximately perpendicular to the direction of travel of the harrow and tine means being secured to said support, a soil contacting elongated element being interconnected to said tined member and mounted for horizontal movement with said tined member, said element extending substantially parallel to and being located beneath said support, said elongated element being provided with at least one inclined edge and including spring means biasing said soil contacting element towards the ground.

4,003,438

CULTIVATOR

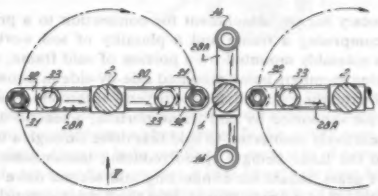
Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Filed Feb. 13, 1975, Ser. No. 549,531

Claims priority, application Netherlands, Feb. 15, 1974, 7402069

Int. Cl.² A01B *33/06*, *33/16*

U.S. Cl. 172—59 **10 Claims**



1. A cultivator implement comprising a plurality of soil-working members positioned side by side in a row that extends transverse to the normal direction of travel of the implement, each soil-working member being rotatable about a respective upwardly extending shaft means mounted on an elongated frame portion, said soil-working members being arranged in two groups and a first group being located on a lateral side of the center of said frame portion opposite from a second group, a drive transmission being connected to the shaft means of said soil-working members to rotate all of the members of said first group in the same direction and in a direction opposite to the direction of rotation of all members of said second group, said drive transmission comprising at least one neighboring driving shaft interposed between the shaft means of adjacent

soil-working members of both groups, said soil-working members each having downwardly extending soil-displacing elements positioned to work soil across the width of said row, each soil-working member comprising at least one soil-displacing element having a lower tip that is spaced from the respective shaft means and positioned to trace a substantially circular path having a diameter substantially twice the perpendicular distance between the shaft means of that soil-working member and the axis of rotation of the neighboring interposed driving shaft.

4,003,439

ROTARY HARROWS

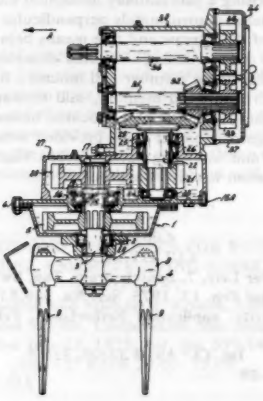
Ary van der Lely, 10, Weverskade, Maasland, Netherlands

Filed May 2, 1975, Ser. No. 574,098

Claims priority, application Netherlands, May 7, 1974, 7406084

Int. Cl.² A01B *33/06*

U.S. Cl. 172—59 **11 Claims**



9. A rotary harrow attachment for connection to a prime mover, comprising a frame and a plurality of soil working members rotatably mounted on a portion of said frame, said soil working members being mounted side-by-side in a row on upwardly extending shafts that are drivenly interconnected in a first drive supported by said frame portion, a second drive being operatively connected to said first drive through a third drive and the latter being a speed reducing transmission assembly of gears, means for connecting said second drive to a power take off of a prime mover, said third drive comprising a first rotary toothed pinion which engages a second rotary toothed pinion of that drive and the latter being located above intermeshing pinion gears of said first drive, said first totary toothed pinion being rotatable about an axis that is substantially parallel to the axes of rotation of said soil working members, said second drive comprising transmission members in a gear box and said first drive including intermeshing pinions housed within said frame portion, the transmission members in said gear box comprising perpendicularly interconnected gears and said first rotary toothed pinion being located below those transmission members, said gear box comprising a change-speed gear assembly, whereby alternative speeds of rotation of said soil working members can be attained in response to an unchanged input speed of rotation of the power take off.

4,003,440

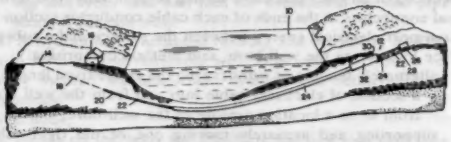
APPARATUS AND PROCESS FOR DRILLING UNDERGROUND ARCUATE PATHS UTILIZING DIRECTIONAL DRILL AND FOLLOWING LINER

Martin D. Cherrington, Carmichael, Calif., assignor to Tidril Corporation, Sacramento, Calif.

Filed Sept. 17, 1974, Ser. No. 506,920

Int. Cl.² E21B *7/04*

U.S. Cl. 175—61 **13 Claims**



1. A method for drilling along an inverted underground arcuate path beneath an obstacle from a first position at or near ground level on one side of the obstacle to a second position at or near ground level on the other side thereof, said method comprising the steps of providing a pilot drill string of a first diameter; providing a directional drill head having at least one cutting drill bit at the leading end of said pilot drill string; crowding and directing said drill string into the ground from said first position on said one side of the obstacle and along said inverted arcuate path and simultaneously powering said drill bit to drill a pilot hole directionally along said path; providing a following liner of second and larger diameter mounted circumferentially about said drill string, the inside diameter of said following liner exceeding the outside diameter of said drill string; and thrusting said liner independently of said drill string into the ground in circumscribing relationship to follow said drill string and not direct said drill string to advance said liner about said drill string along the inverted arcuate path for a length less than the penetration of said pilot string into the ground.

4,003,441

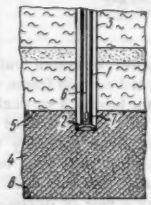
METHOD OF OPENING CARBON-BEARING BEDS WITH PRODUCTION WELLS FOR UNDERGROUND GASIFICATION

Efim Lvovich Lokshin, ulitsa Zheleznodorozhnaya, 30, kv. 30, Zagorsk Moskovskoi oblasti; Alfei Fedorovich Volk, ulitsa Kropotkinskaya, 40, kv. 14, and Anatoly Antonovich Starinsky, 1 Golutvinsky pereulok, 21, kv. 29, both of Moscow, all of U.S.S.R.

Filed Apr. 22, 1975, Ser. No. 570,494

Int. Cl.² E21B *21/00, 33/14, 47/04*

U.S. Cl. 175—71 **6 Claims**



1. A method of opening carbon-bearing beds with production wells for underground gasification which includes the drilling of a production well until the top of a bed is opened, ceasing said drilling on entering the upper layer of said bed, determining the depths of both the top and bottom of said bed, resuming said drilling of said bed so as to leave a pillar portion of said carbon-bearing bed at a depth where the possibility of communication between the adjacent wells by means of a fluid is assured through the body of said bed, when said production well is completed with a cemented casing string down to the

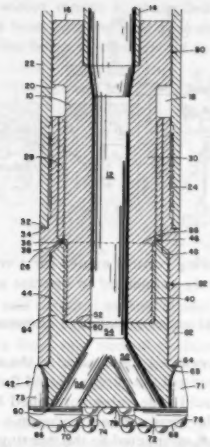
top of said pillar portion, cementing a string of casing in said well to the top of said pillar portion and drilling said pillar portion left between the shoe of casing pipe string and the bottom of said bed.

4,003,442

DETACHABLE DRILL BIT FOR IMPACT DRILLING

Ross Bassinger, San Antonio, Tex., assignor to Reed Tool Company, Houston, Tex.

Filed Oct. 6, 1975, Ser. No. 619,931
Int. Cl.² E21C *13/00*
U.S. Cl. 175—410 **9 Claims**



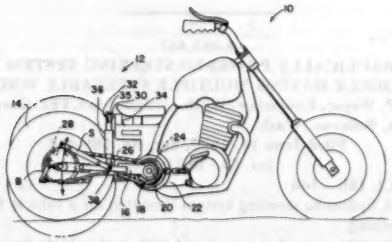
1. A drilling bit for use in a percussion drilling tool having a casing, a driver sub, and an anvil member slidably positioned in said sub; said bit having an external cutting surface, a circumferential shoulder, and a sliding surface extending from said shoulder for telescopic continuous engagement with said driver sub, and means on said bit spaced from said shoulder for releasably connecting said bit to said anvil member and located entirely within said driver sub during normal operation of said drilling tool so that bending moments are transmitted through said sliding surface to said driver sub.

4,003,443

MULTIPLE WHEEL MOTORCYCLE SUSPENSION AND DRIVE SYSTEM

Gordon Neal Boughers, Dublin Road, Street, Md. 21154

Filed July 31, 1975, Ser. No. 600,591
Int. Cl.² B62K *25/00*; **B60G** *19/00*
U.S. Cl. 180—27 **9 Claims**



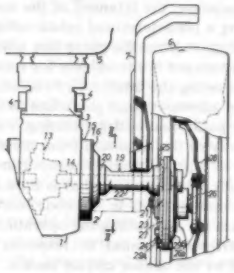
1. In a motorcycle having a frame, a steerable front wheel, first and second laterally related rear wheels having respective axles, a wheel suspension system connecting all said wheels with the frame, an engine, and means connecting the engine with the rear wheels, the improvement comprising: the connecting means including: a driveshaft transversely journaled in the frame, means for rotating all said rear wheels in response to driveshaft rotation, the driveshaft having a differential therein responsive to the means for rotating the driveshaft whereby each rear wheel can be rotated relative to the other said rear wheel, the suspension system including means pivotally supporting each rear wheel independently about the driveshaft axis, the wheel suspension system including a transverse arm having first and second ends and a pivotal connection to the frame intermediate said ends, first and second dashpot members, each dashpot member having connection at the upper end thereof with a respective end of said transverse arm, and each dashpot member having a pivotal connection at the lower end thereof with a respective means for supporting a rear wheel.

4,003,444

CONSTRUCTION FOR UNITING THE BRAKE CASE COVER, REAR WHEEL AXLE CASE AND TERMINAL SPEED REDUCTION UNIT CASE OF TRACTOR

Kazunari Nobutomo, Soja; Seiti Ikegami, Osaka; Masahide Osujo, Osaka; Yoshinobu Murayama, Osaka; Takaho Omura, Osaka, and Sinzi Kawakami, Soja, all of Japan, assignors to Kuboto Tekko Co., Ltd., Osaka, Japan

Filed Oct. 3, 1975, Ser. No. 619,492
Claims priority, application Japan, Mar. 4, 1975, 50-27508; Apr. 3, 1975, 50-40856; Apr. 3, 1975, 50-40857; Mar. 20, 1975, 50-38909
Int. Cl.² B60K *17/00*
U.S. Cl. 180—75 **5 Claims**



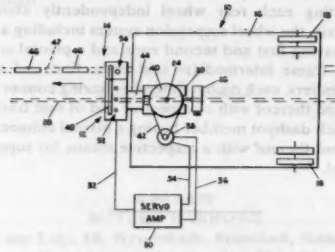
1. A construction for uniting a brake case cover, a rear wheel axle case and a terminal speed reduction unit case in a tractor comprising a sheet metal brake cover case having a precisely circular hole and fixed to each side of a tractor main body to cover brake means, a rear wheel axle case for housing a differential yoke shaft which case is made of sheet metal and has precisely circular enlarged tubular portions at its opposite ends and a flat tubular intermediate portion of a reduced diameter for mounting a fender thereon, and a sheet metal case composed of a pair of inner and outer segments for housing the terminal speed reduction unit and having an upper portion for supporting the outer end of the differential yoke shaft and a lower portion for supporting a rear wheel axle, the inner end enlarged tubular portion of the rear wheel axle case being fitted in the hole of the brake case cover and welded to the hole-defining periphery of the brake case cover, the outer end enlarged tubular portion of the rear wheel axle case being fitted in the yoke shaft supporting upper portion of the terminal speed reduction unit case and welded to the inner periphery of the upper portion, the intermediate portion of the rear axle case being substantially flexible to absorb concentric loads on the weld joints.

4,003,445

CODE CIRCUITRY FOR A VEHICLE GUIDANCE MECHANISM

Carl De Bruine, Grand Rapids, Mich., assignor to Lear Siegler, Inc., Santa Monica, Calif.

Filed Feb. 12, 1976, Ser. No. 657,447
Int. Cl.² B62D 1/28
U.S. Cl. 180—98 18 Claims



1. In a vehicle guidance mechanism for guiding a vehicle along a guide line by means of guide line radiation received from the guide line, code circuit means for automatically controlling the operation of the vehicle along the guide line comprising:

code marker means positioned alongside the guide line at predetermined positions along the guide line where control functions are desired, the code marker means being positioned in a code marker path alongside the guide line, the code marker means being formed such that code marker radiation representing a code marker signal is transmitted from the code marker means at least at a specified time when the vehicle is in position to sense said marker radiation, the intensity of the code marker radiation having a predetermined relationship to the intensity of the radiation from the guide line adjacent to it;

sensor circuit means in the vehicle for sensing and continuously comparing the intensity of radiation received from the code marker path and guide line as the vehicle moves along the guide line and generating a code signal when the intensity of the radiation from the code marker path increases to a predetermined proportion of the intensity of the guide line radiation that is indicative of the presence of a code marker in the code marker path; and

control means for controlling the operation of the vehicle in a predetermined manner in response to code signals generated by the sensor circuit means.

13. Code circuit means for automatically controlling the operation of a vehicle along a predetermined guide path comprising:

at least one code marker of a predetermined length positioned adjacent the guide path, said code marker transmitting a code marker signal indicative of the position of the code marker;

code sensor means mounted in the vehicle so as to receive the code marker signal from the code marker as the sensor means passes the code marker, the code marker signal being received for a period of time representative of the time it takes for the sensor means to pass the code marker, said code sensor means generating a code signal at an output thereof while the code marker signal is being sensed;

delay circuit means connected to the output of the code sensor means, said delay circuit means blocking the transmission of said code signal unless the duration of the code signal is sufficient to indicate the presence of a code marker of at least said predetermined length at least when the vehicle is traveling at a predetermined speed past the code marker; and

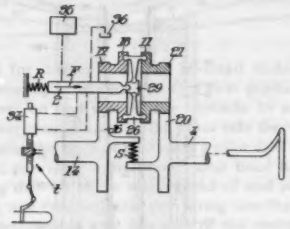
control circuit means responsive to said code signal for controlling the operation of the vehicle in a predetermined manner.

4,003,446

SERVO-STEERING CONTROL SYSTEMS FOR VEHICLES

Jacques Fleury, Paris, France, assignor to Societe Anonyme Automobiles Citroen, Paris, France

Filed May 9, 1975, Ser. No. 576,210
Claims priority, application France, May 16, 1974, 74.017072
Int. Cl.² B62D 5/08
U.S. Cl. 180—132 10 Claims



1. A servo-steering control means for a vehicle comprising

a jack operatively connected to operate a steering mechanism;

a source of fluid under pressure in communication with the jack;

a slide valve operatively connected to the sources of fluid to the jack to control the supply of said fluid under pressure to the jack, said slide valve controlled by means responsive to angular displacement between a driving shaft and a second shaft connected to the steering mechanism, said two shafts being mechanically connected through a lost motion connection permitting limited relative angular displacement between said shafts,

the said means for controlling the slide valve including two rotary members rotatable about a common geometric axis and being respectively driven by drive means having the same ratio, one of said drive means connected to the driving shaft and the other to the second shaft, and means connected between said rotary members and said valve member to convert relative rotation between said rotary members into translational movement of said slide valve,

said servo-steering control further including spring means operatively connected to the slide valve to exert an axial force on said slide valve,

elastic means disposed between the drive shaft and said second shaft to resist relative angular displacement of said shafts,

the tension of said spring means and elastic means being adapted to maintain the slide valve in a neutral position when the relative rotation between the two shafts is substantially zero.

4,003,447

HYDRAULICALLY POWERED STEERING SYSTEM FOR A VEHICLE HAVING MULTIPLE STEERABLE WHEELS

Paul P. Weyer, Enumclaw, Wash., assignor to CTEC Corporation, Bellevue, Wash.

Filed June 19, 1975, Ser. No. 588,422
Int. Cl.² B62D 5/08
U.S. Cl. 180—140 12 Claims

1. A hydraulic steering system mounted on a vehicle frame comprising:

a steerable member associated with said vehicle frame for rotational movement relative to said vehicle frame and a wheel supporting member affixed to and extending downwardly from said steerable member,

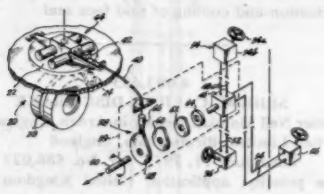
a shaft affixed to and extending upwardly from said steerable member and being rotatable with said steerable member,

a housing mounted on said shaft, said shaft being rotatable within said housing,

reversible hydraulic motor means operably coupled to said steerable member to bidirectionally rotate said steerable member relative to said housing,

an actuator means responsive to an operator command for actuating a hydraulic control valve,

said hydraulic control valve including a body and a control member for controlling the flow of hydraulic fluid to said motor means, said control member having a neutral position relative to said body in which the flow of hydraulic fluid to the motor means is controlled to prevent said motor means from rotating said steerable member, said control member being so constructed to be responsive to



movement of said actuator means on said vehicle to move said control member relative to said valve body in a first direction away from said neutral position to control the flow of fluid to said motor means, thereby causing the motor means to rotate said steerable member in a first direction,

feedback means mounting said valve body on said housing and coupling said valve body to said shaft for moving said valve body in said first direction relative to said control member in response to rotation of said steerable member by said motor means, thereby returning said control member to its neutral position, and

means on said housing for connecting said housing to said vehicle frame to prevent rotational movement of said housing relative to said frame while allowing said housing to move when said shaft moves transversely to the rotational axis of said shaft.

4,003,448

JET CATCHERS

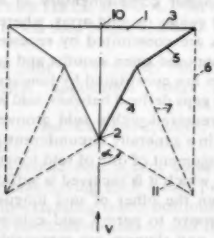
Lionel Fitzroy East, and Kenneth George Winter, both of Bedford, England, assignors to National Research Development Corporation, London, England

Filed Feb. 4, 1975, Ser. No. 547,097

Claims priority, application United Kingdom, Feb. 7, 1974, 5766/74

Int. Cl.² E04B *1/99*

U.S. Cl. 181—33 HE **14 Claims**



1. A jet catcher for use in an unenclosed gaseous jet stream comprising a base member having a central axis; said base member including a top portion, a bottom portion located in a downstream direction from the top portion when said central axis is disposed substantially parallel to the direction of flow of said unenclosed gaseous jet stream, and sides diverging outwardly from the central axis as they join the top portion to said bottom portion; and a plurality of porous screens extending from upstream of the base member to positions along said sides with each screen extending at an angle with respect to said central axis, said angle of each screen and said central axis decreasing successively in said downstream direction so that on passage through each screen the portion of the jet stream caught by the jet catcher will be deflected outwardly away from said central axis.

4,003,449

PLANAR DIAPHRAGM

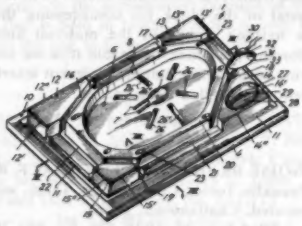
Jose Juan Bertagni, San Martin de Tours 2918 6° piso, Buenos Aires, Argentina

Filed Nov. 26, 1975, Ser. No. 635,288

Claims priority, application United Kingdom, Nov. 28, 1974, 51617/74

Int. Cl.² G10K *13/00*; H04R *7/00*

U.S. Cl. 181—173 **6 Claims**



1. In a substantially planar diaphragm for use in an electroacoustic transducer, a plate-like member made of cellular plastics material, said plate-like member having a substantially flat front face and a rear face, a marginal portion circumscribing an asymmetrically shaped portion on the rear face, said marginal portion being subdivided into an outer edge portion of less thickness —with regard to said front face— than the remainder of said marginal portion and spaced apart therefrom through an endless channel portion of still smaller thickness —with regard to said front face— than said edge portion and which endless channel portion defines a pivotal connection and a bar for the progress of vibrations which may be produced at the asymmetrically shaped portion as well as at predetermined zones of said remainder of said marginal portion, said remainder of said marginal portion being subdivided by further channelled portions to define an endless marginal portion directly surrounding said asymmetrically shaped portion and a plurality of intermediate marginal portions, said endless marginal portion having anchored therein at least one insert member of different density than the density of said endless marginal portion.

4,003,450

SMALL STRUCTURAL BUILDING COMPONENT

Walter Löhl, Heilbronn, Germany, assignor to Kenngott GmbH & Co. KG, Germany

Filed Apr. 23, 1975, Ser. No. 570,775

Claims priority, application Germany, Apr. 25, 1974, 2419949

Int. Cl.³ E04F *11/14*

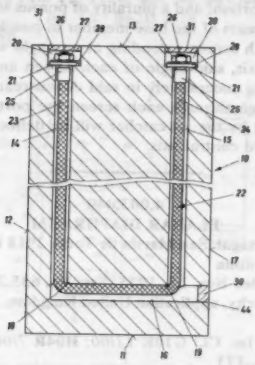
U.S. Cl. 182—194 **27 Claims**

1. A building component, comprising;

a block of natural rock material presenting a styled appearance on substantially all surfaces thereof, and having two longitudinal bores, each extending into said material and

through the same adjacent and along one side of the block, and a transverse bore extending through said material adjacent and along an end of the block and interconnectng the longitudinal bores; and

elongate reinforcing means extending though the longitudi-



nal and transverse bores and anchored to the natural rock material of the block for compressing the material to close hairline cracks of the material and for thereby reinforcing the block to enable it to be used as a load-bearing, structural element, while not interfering with its presenting its styled appearance.

4,003,451

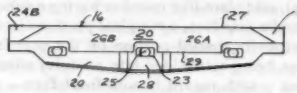
LOW NOISE BRAKE SHOE FOR TRACK RETARDER

Harold Franklin Torok, Chattanooga, Tenn., assignor to QIV Incorporated, Chattanooga, Tenn.

Filed June 30, 1975, Ser. No. 591,288

Int. Cl.² B61K *7/04*

U.S. Cl. 188—62 **10 Claims**



1. A brake shoe for track retarder apparatus comprising:

a. An elongated member that may be suitably attached to a jaw in a track retarder apparatus, and

b. A continuous braking surface included in the elongated member, the braking surface comprising a series of discrete variable widths along the length of the member having a first and a second edge, the first edge lying in a common plane, the second edge lying in stepped planes parallel to said common plane wherein said discrete variable widths reduce noise generation in the track retarder apparatus.

4,003,452

BRAKE SEAL

Bernard F. Kupfert, Peoria, and Richard L. Augustine, Washington, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

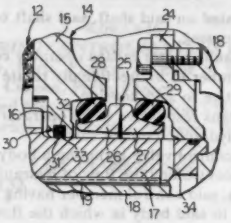
Filed June 10, 1976, Ser. No. 694,630

Int. Cl.² F16D *65/853*

U.S. Cl. 188—71.6 **12 Claims**

1. In a disc brake assembly having means defining a brake chamber provided with pressurized cooling oil, a brake housing, means defining a differential chamber provided with lubricating oil, a rotatable hub, and an annular face seal for sealing the hub to the brake housing against loss of the cooling oil, the improvement comprising:

sealing means for sealing the hub to the brake housing inwardly of the face seal; and



means for conducting lubricating oil from said differential chamber to said face seal for maintaining a preselected lubrication and cooling of said face seal.

4,003,453

SLIDING CALIPER DISC BRAKE

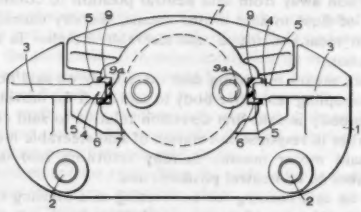
Christopher Neil Mathias, Henley-in-Arden, England, assignor to Girling Limited, Birmingham, England

Filed June 11, 1975, Ser. No. 586,021

Claims priority, application United Kingdom, June 19, 1974, 27086/74

Int. Cl.² F16D *55/18*

U.S. Cl. 188—72.4 **6 Claims**



1. A vehicle disc brake comprising a carrier, a rotatable disc, a caliper straddling a portion of a peripheral edge of said disc and slidably mounted on said carrier for movement in a direction substantially parallel to the axis of said disc, first and second friction pad assemblies for engagement with opposite faces of said disc located in said caliper, actuating means incorporated in said caliper for applying said first friction pad assembly directly to one face of said disc, said second friction pad assembly being applied to the opposite face of said disc by the reaction on said caliper which causes said caliper to move in an axial direction with respect to said carrier, and spaced arms incorporated in said carrier and extending axially in a direction away from said disc, said spaced arms providing a pair of spaced parallel guides, a pair of axially extending guides on said caliper complementary to and co-operating slidably with said guides on said arms, wherein said guides of one of said pairs are constituted by recessed walls defining grooves having opposed open mouths and said guides of the other of said pairs are constituted by tongues for reception in said grooves with gaps defined between said walls and portions of said tongues received within said grooves, dimensions of said gaps at least in a generally circumferential direction being such that an engagement of one of said tongues with said wall of said groove in which it is received is sufficient to provide a clearance between the other of said tongues and said open mouth of that groove to permit said caliper to be removed from said brake, and slippers are removably located in said gaps between said guides of both co-operating pairs to retain said caliper against movement with respect to said carrier in both radial and circumferential directions, said slippers being

axially slidable out of said gaps whereafter said caliper can be removed from said brake in a generally radial direction.

4,003,454

SHOCK ABSORBER

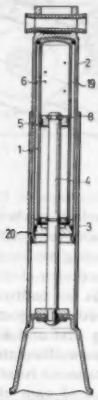
Felix Wössner, Schweinfurt am Main, Germany, assignor to Fichtel & Sachs A.G., Schweinfurt am Main, Germany

Filed Apr. 30, 1975, Ser. No. 573,330

Claims priority, application Germany, May 9, 1974, 2422479

Int. Cl.² B60R 19/06

U.S. Cl. 188—322 **5 Claims**



1. An impact shock absorber comprising:

a. a cylinder part;

b. a piston glidingly mounted in said cylinder part and held in a rest position under a yielding force;

c. a piston rod part having an inner end in said cylinder part and extending outside said cylinder part;

d. first connecting means for connecting one of said parts to a body element of a car;

e. second connecting means for connecting the other part to a bumper element of said car, whereby the shock absorber may mount said bumper element on said body element for relative movement in respect thereto under an impact acting on said bumper element and causing the piston rod part to move in the cylinder part; and

f. third connecting means connecting said inner end to a portion of said piston, said portion being weakened at the point of connection to break when said impact exceeds a predetermined maximum force, said yielding force resisting movement of said piston by said piston rod part under said impact.

4,003,455

BAG CONVERTIBLE INTO A PORTABLE SEAT

Gaetano Cortese, Via Ada Negri 9, 20032 Cormono (Milan), Italy

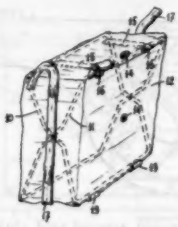
Filed June 4, 1975, Ser. No. 584,019

Claims priority, application Italy, June 18, 1974, 21416/74[U]

Int. Cl.² A45C 9/00

U.S. Cl. 190—8 **6 Claims**

1. A bag convertible into a seat comprising two similar quadrangular frames having each a first pair of parallel normally horizontally extending frame portions and a second pair of parallel frame portions normal to said first frame portions and integrally connecting said first pair at opposite ends, the second pair of frame portions of one frame crossing the second pair of the other frame and are pivotally connected to the latter midway between opposite ends thereof, said frames being movable between a closed position in which said first frame portions of one frame are closely adjacent to said first frame portions of the other frame, and a spread-apart position; tear resistant, flexible material encompassing said frames to form a bag having an open end and including a flap extending over the open end and downwardly over a front portion of the bag, when said frames are in said closed position, said flap



having a free edge located closely adjacent one of said first frame portions when said frames are in said spread-apart position; and at least one hook connected to the inner face of said flap adjacent said free edge and engageable with said one first frame portion in the spread-apart position of the frames so that said flap is held in taught condition over the wide-opened end of the bag to form a seating surface.

4,003,456

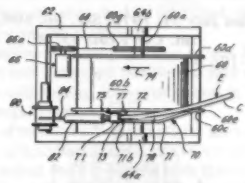
ELECTRICAL CABLE REELING APPARATUS

Roy H. Cullen; Joshua M. Jackson, and Terry V. Jones, all of Houston, Tex., assignors to General Electric Company, by said Joshua M. Jackson and said Terry V. Jones

Filed Oct. 9, 1975, Ser. No. 621,111

Int. Cl.² H02G 11/02

U.S. Cl. 191—12.4 **9 Claims**



1. An apparatus for receiving, storing, and supplying a fixed length of an electrical cable section having substantially rigid terminal connectors at each end thereof, said apparatus comprising:

a reel adapted for rotation with a section of electrical cable being helically wound on or unwound from said reel; and

releasable securing means for securing one of the electrical cable terminal connectors with the reel for rotation therewith while the cable is wound on or unwound from the reel and for releasing a secured connector from the reel to thereby release the entire length of the cable from the reel upon unwinding.

4,003,457

CLUTCH HAVING OVERSIZED ROLLERS

Arvid Dahlstrom, Chicago, Ill., assignor to Dahltron Corporation, Oakbrook, Ill.

Filed Feb. 10, 1975, Ser. No. 548,598

Int. Cl.² F16D 41/06

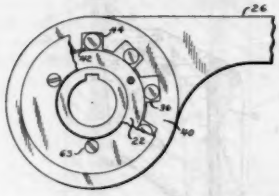
U.S. Cl. 192—45 **13 Claims**

1. A clutch comprising:

a clutching member having a central aperture and channel means disposed therein;

a clutched member disposed within said aperture and spaced apart from said clutching member;

clutch means disposed co-axially in said aperture between said clutching member and said clutched member, said clutch means including a plurality of force-transmitting rollers surrounding said clutched member and roller means larger in diameter than the force-transmitting



rollers being disposed around said clutched member to support said clutching member on said clutched member independently of said force-transmitting rollers for rotation; and

said channel means comprising a series of transversely extending channels for carrying said force-transmitting rollers and a series of rectangular slots for carrying said roller means.

4,003,458

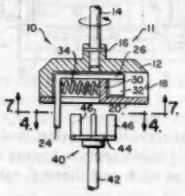
FAIL SAFE CENTRIFUGAL CLUTCH

James K. O'Steen, Olney, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 31, 1975, Ser. No. 600,660

Int. Cl.² F16D *43/14*

U.S. Cl. 192—105 BB **8 Claims**



1. A fail-safe, velocity-discriminating centrifugal clutch comprising:

a driving assembly coupled to a rotary input shaft;

a biased means in said driving assembly displaceable from a non-motion-transmitting position to a motion-transmitting position at rotational speeds above a predetermined threshold value, said means having a motion-transmitting engagement portion extending from said assembly parallel to said input shaft;

a driven assembly operatively positioned adjacent to said driving assembly and coupled to a rotary output shaft;

a ratchet wheel secured to the output shaft; and

a plurality of upstanding planar elements peripherally positioned on said ratchet wheel and oriented parallel to said rotary input and output shafts for driving contact by the motion-transmitting engagement portion of said biased means in the motion transmitting position of said means to transmit motion from the driving assembly to the driven assembly.

4,003,459

WRITING MACHINES

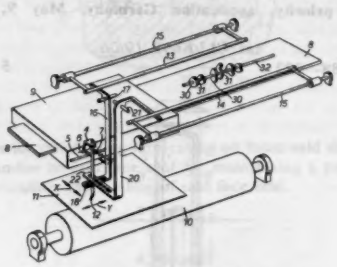
Robert Adolphus Guy Moffatt, 9 Rodfords Mead, Hengrove, Bristol, England

Filed Nov. 26, 1974, Ser. No. 527,276

Claims priority, application United Kingdom, Nov. 28, 1973, 55182/73

Int. Cl.² B41J *3/06*

U.S. Cl. 197—1 R **2 Claims**



1. A writing machine including a writing instrument, means for moving said instrument longitudinally in relation to a writing surface, and mounting means permitting movement of said instrument in two orthogonal directions, a plurality of mechanical memory stores for controlling the movements of said instrument in said two orthogonal directions, each said memory store comprising first and second cooperating cam elements, all of the first cam elements of said memory stores being mounted for simultaneous rotation on a common drive shaft, and all of said second cam elements being independently movable relative to each other, motion transmitting means operatively connecting each of said second cam elements to said instruments, said transmitting means including an actuating rail extending parallel to the longitudinal movement of said instrument, and means for moving said rail in a direction transverse to its length, and a plurality of manual keys each operatively associated respectively with one of said pairs of cooperating cam elements and acting selectively to connect said cam elements with said instrument, said actuating rail being pivotally mounted for rocking movement about an offset axis parallel to the length of said rail, each of said second cam elements comprising a step-down mechanical transmission such that the movement of said rail is less than the corresponding movement of the respective first cam elements, the motion transmitting means connected between said rail and said instrument comprising a step-up mechanical transmission which provides increased movement of said instrument in relation to the movement of said rail.

4,003,460

TYPE RIBBON DESKEWING MEANS FOR A TYPE RIBBON FEED APPARATUS

Darby A. Gray, Norman, and Roger L. Hall, Bethany, both of Okla., assignors to Honeywell Information Systems, Inc., Waltham, Mass.

Filed June 21, 1974, Ser. No. 481,738

Int. Cl.² B41J *35/04, 35/12*

U.S. Cl. 197—170 **6 Claims**

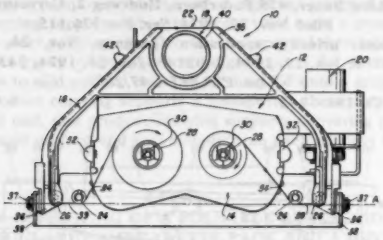
1. In a ribbon feed apparatus having a base plate, a ribbon, type ribbon spools, drive means for engaging the ribbon spools for winding the ribbon from one ribbon spool to the other ribbon spool, the improvement comprising:

a ribbon guide for receiving the ribbon from one ribbon spool, guiding the ribbon through a print position, and returning the ribbon to the other ribbon spool, said ribbon guide comprising a center portion and two end portions, said center portion being adjacent to the print position for guiding the ribbon in front thereof, and said end portions being pivotally attached to the base plate,

said ribbon guide furthermore including an axis of rotation through said end portions;

ribbon guide lift means attached to the ribbon guide and the base plate for changing the position of the ribbon as the ribbon passes through the print position; and

ribbon deskewing means for preventing the ribbon from skewing as the ribbon is wound on the ribbon spool, said ribbon deskewing means comprising:



pivot guides attached to said end portions of said ribbon guide and rotatable thereon, said pivot guides guiding the ribbon onto and off of the ribbon guide;

stationary guides disposed between the type ribbon spools and said pivot guides, said stationary guides guiding the ribbon onto and off of the ribbon spools; and

said axis of rotation of said ribbon guide being concentric with the center line of the ribbon portion positioned between said pivot guides and said stationary guides.

4,003,461

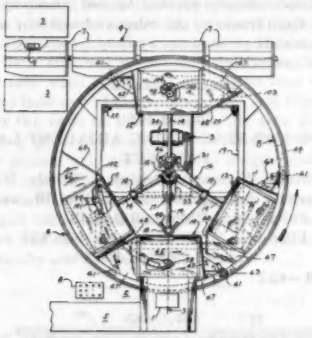
ROTARY LOADING APPARATUS

Richard L. Speaker, and David W. Wolbrink, both of Hartford, Wis., assignors to Speaker Motion Systems, Inc., Germantown, Wis.

Filed Apr. 15, 1974, Ser. No. 460,950

Int. Cl.² B65G *21/12*

U.S. Cl. 198—597 **32 Claims**



1. In rotary transfer apparatus having at least one arm member having a rotating pivot support and mounted for rotation about a first axis, a load supporting unit secured to the arm member, a rotating drive means having a second axis parallel with and spaced from the first axis, coupling means connected to said drive means and movably connected to said arm member and moving along said arm member as the arm member rotates to continuously vary the drive connection along the length of the arm member and thereby continuously control of the velocity of the load supporting structure while moving the load supporting structure in a predetermined circular path.

4,003,462

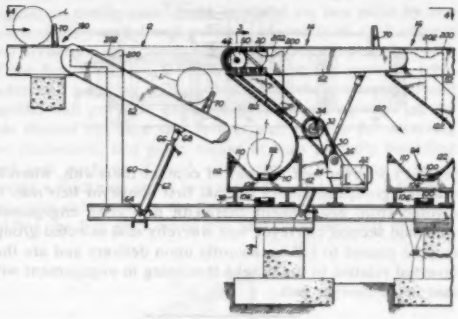
LOG SORTING SYSTEM

Lynn F. Perrott, 15928 NE. Rose Parkway, Portland, Oreg. 97230

Filed Feb. 6, 1976, Ser. No. 655,826

Int. Cl.² B65G *37/00*

U.S. Cl. 198—369 **15 Claims**



1. A sorting system for logs and like elongated objects, comprising:

a. a plurality of longitudinally aligned, transversely articulated sorting conveyor means arranged to convey elongated objects disposed crosswise thereof,

b. drive means engaging the plurality of sorting conveyor means for moving them in an outfeed direction,

c. power means engaging each sorting conveyor means for moving the latter between a conveying position aligned with the other conveyor means and a discharge position tilted downward toward its outfeed end,

d. stop means mounted on the outfeed end of each articulated sorting conveyor means movable between an extended position above the conveyor means for abutment by an object thereon and a retracted position out of abutment by an object thereon,

e. actuator means engaging the stop means for moving the latter from said retracted position to said extended position when said sorting conveyor means is being tilted to said discharge position,

f. a plurality of transfer conveyor means associated one with with each articulated sorting conveyor means and each having an infeed end registering with the sorting conveyor means in the discharge position of the latter, the transfer conveyor means extending laterally of its associated sorting conveyor means,

g. drive means engaging the plurality of transfer conveyor means for moving them in an outfeed direction, and

h. collector means adjacent the outfeed end of each transfer conveyor means for receiving objects discharged therefrom.

4,003,463

APPARATUS FOR TRANSPORTING BUNDLES OF FLAT ARTICLES

Barrie Holt, Poynton, and Jeremy Peter Barlow, Northwich, both of England, assignors to Henry Simon Limited, Stockport, England

Filed June 5, 1975, Ser. No. 583,890

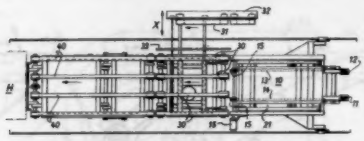
Claims priority, application United Kingdom, Jan. 8, 1974, 25560/74

Int. Cl.² B65G *47/24*

U.S. Cl. 198—374 **3 Claims**

1. Apparatus for feeding rectangular blanks of corrugated paper board comprising a first conveyor belt having a forward end disposed for delivery of blanks in predetermined forwardly falling orientation to a box making machine or the like and means for driving said belt, a second conveyor belt transversely spaced from and parallel with said first conveyor belt and adjacently arranged at a lower level and means for driving

said second conveyor belt in the same direction as and at a higher speed than said first conveyor belt, means for delivering a stack of said blanks onto said first conveyor belt in such manner that the blanks are supported on only one edge on and extend substantially vertically transversely of said first conveyor belt with said edge extending outwardly to overlie said



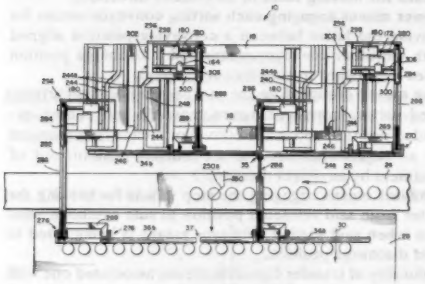
second conveyor belt but out of contact therewith, whereby selected groups of blanks on said first conveyor belt may be pivoted from engagement therewith into edge engagement with said second conveyor belt whereby said selected groups may be caused to fall backwardly upon delivery and are thus inverted relative to the blanks remaining in engagement with said first conveyor belt.

4,003,464

DOUBLE ARM PUSH BAR STACKER

Anthony T. Zappia, Indianapolis, Ind., assignor to Ball Brothers Service Corporation, Muncie, Ind.

Filed Apr. 1, 1975, Ser. No. 564,103
Int. Cl.² B65G 47/26
U.S. Cl. 198—430 **19 Claims**



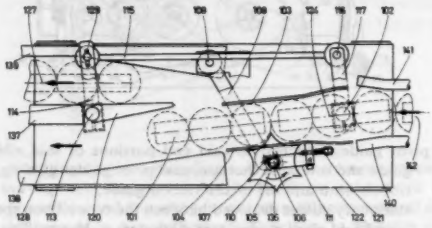
1. A stacker-pusher comprising frame means, a pair of parallel bars extending longitudinally and horizontally along said frame means, said bars having the same general length, said bars being movable alternately through the same general path including a transverse horizontal stroke perpendicular to the direction of extension of said bars, and said bars remaining parallel to each other as they move through said path, in which the improvement comprises means for mounting said bar for such movement and means for driving said bars, said mounting means including, for each said bar, a carriage reciprocably movable in the direction of said transverse horizontal stroke, a first arm mounted on said carriage for pivotal movement at its proximal end about a horizontal axis parallel to said bars, a second arm mounted on the distal end of said first arm for pivotal movement about a horizontal axis parallel to the last said axis, said second arm extending downwardly to provide a lower end to which said bar is attached, and said drive means including, for each said bar, a pair of rotor means journal mounted for rotation about horizontally extending axes parallel to said bars and spaced apart in the direction of said stroke, endless means trained about said rotor means, means for providing a driving connection between said endless means and said carriage associated with said bar and between said endless means and said first arm pivoted on said carriage, whereby movement of said endless means about said rotor means reciprocates said carriage and raises and lowers said first arm, and said drive means being synchronized such that said bars alternately move through said path at the same frequency and speed.

4,003,465

APPARATUS FOR DISTRIBUTING ARTICLES CONVEYED IN A ROW AMONG A PLURALITY OF PATHS OF TRAVEL

Everhard Bauer, 479 Paderborn, Hudeweg 2, Germany

Filed Nov. 22, 1974, Ser. No. 526,115
Claims priority, application Germany, Nov. 26, 1973, 2358771; Jan. 17, 1974, 2402145; July 26, 1974, 2436151
Int. Cl.² B65G 47/28
U.S. Cl. 198—442 **6 Claims**



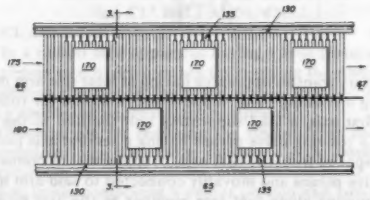
1. Apparatus for distributing articles conveyed in a single row at a receiving station into a plurality of juxtaposed rows at a downstream delivery station, comprising means defining at said delivery station a plurality of juxtaposed delivery tracks for said articles with mouths facing said receiving station, gate means defining a passageway for said articles with an inlet adjacent said receiving station and an outlet pointing in the downstream direction, said gate means being mounted for pivotal motion about an axis at said inlet whereby said outlet can be oscillated, and drive means operable by said articles passing through said passageway for effecting pivotal motion of said gate means, said drive means comprising a wheel mounted on said gate means for pivotal motion in unison therewith and for independent rotation, teeth on the periphery of said wheel projecting into said passageway for engagement by said articles whereby said wheel is rotated by said articles, and a lever eccentrically pivoted to said wheel by one end pivoted to a fixed frame by the other end whereby said wheel and gate means are pivoted once to and fro during each complete turn of said wheel.

4,003,466

CONVEYOR FOR STAGGERING ADJACENT LANES OF PRODUCT

William R. Muth, Westmont; Stephen J. Pawela, Wood Dale, and Richard G. Wood, Blue Island, all of Ill., assignors to Velten & Pulver, Inc., Chicago Ridge, Ill.

Filed May 9, 1975, Ser. No. 575,935
Int. Cl.² B65G 47/26
U.S. Cl. 198—452 **8 Claims**



1. Apparatus for staggering product delivered to multiple adjacent product lanes, said apparatus comprising a plurality

of longitudinally extending product lanes each comprised of groups of rotatable product carrying supports and groups of rotatable product positioning supports forming an endless conveyor having an infeed end and an outfeed end, said conveyor including a plurality of transversely extending rods each carrying a product carrying support and a product positioning support, each group of product carrying supports being transversely aligned with at least one group of product positioning supports, and mechanism for rotating said product positioning supports to position product onto an adjacent group of product carrying supports, whereby product fed onto a group of said product positioning supports is transported thereby to an adjacent group of product carrying supports for transport thereon to said outfeed end and product fed onto a group of said product carrying supports is transported thereon to said outfeed end, said product carrying supports delivering product to said outfeed end sequentially from each product lane.

4,003,467

PACK CONSISTING OF A FOLDABLE BLANK, MORE PARTICULARLY A CIGARETTE PACK AND A DEVICE FOR CLOSING THE SAME

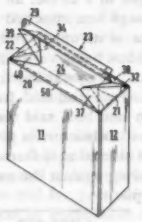
Heinz Focke, and Kurt Liedtke, both of Verden, Aller, Germany, assignors to Focke & Pfuhl, Verden, Aller, Germany

Filed Feb. 19, 1975, Ser. No. 551,451

Claims priority, application Germany, Feb. 19, 1974, 2407766

Int. Cl.² B65D *85/10*

U.S. Cl. 206—273 **18 Claims**



1. A pack for cigarettes or the like formed from a foldable blank of compound foil material wherein the blank has a front wall, a back wall, two side walls, front end flaps attached to the front wall, back end flaps attached to the back wall, and side end flaps attached to the side walls wherein the front, back and side walls are folded to enclose four sides of the contents, at least one of the front and rear end flaps are folded to contact the ends of the contents, the side end flaps are folded along generally diagonal fold lines to form generally triangular gussets, said gussets having longitudinal free edges which are staggered in a gradation of thickness with respect to each other and to the fold line of the flap folded against the contents and the remaining flap is folded over the entire end of the pack and the free edge is sealed across its entire width to hermetically seal the end of the pack.

4,003,468

CASE AND INSERT FOR DIFFERENTLY SIZED MAGNETIC TAPE ENCLOSURES

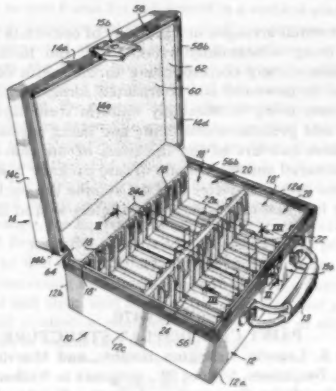
Joseph L. Berkman, 48 Country Road, Mamaroneck, N.Y. 10543

Continuation-in-part of Ser. No. 382,302, July 25, 1973, Pat. No. 3,889,817. This application Mar. 24, 1975, Ser. No. 561,315

Int. Cl.² B65D *85/30*, *85/62*, *85/67*, *5/50*

U.S. Cl. 206—387 **20 Claims**

1. In combination with a carrying case having a housing or receptacle, at least one insert for said casing being of the type for interchangeably receiving and storing two differently sized magnetic tape enclosures having generally rectangular configurations, the first enclosure having a smaller width and a greater thickness than the corresponding dimensions of the second enclosure, and having a height greater than the height of the second enclosure; said insert comprising a plurality of tandem storage compartments each of which is adapted to interchangeably receive a first or a second dimensioned magnetic tape enclosure, each compartment being generally rectangular in configuration and bounded on two sides by two substantially parallel wall portions spaced from each other a first predetermined distance approximately equal to the width of the first enclosure to securely receive the same therebetween and a further wall portion substantially normal to said parallel wall portions, each compartment being open on the side thereof opposite said further wall portion for receiving the enclosures; and guide means at least partially bounding said wall portions of each compartment to define a space having a thickness equal to a second predetermined distance approximately equal to the thickness of the first enclosure for guiding the first enclosures into said compartments and preventing the first enclosures from moving therein, an elongate rectangular recess provided in at least one of said spaced parallel wall portions of each compartment which opens at said compartment open end and is spaced from said further wall portions so as to form a depth limiting shoulder adapted to maintain at least a portion of said second enclosure projecting above said parallel wall portions upon full insertion of said second enclosure into said compartment, each recess forming retaining wall portions which define a space having a width greater than said first predetermined distance and a thickness smaller than said second predetermined distance suitable for securely receiving a second enclosure to thereby prevent movements of a second enclosure within said compartments, whereby the manual gripping of any second enclosure is facilitated by said depth limiting shoulder, and whereby each compartment can interchangeably receive either a first or a second enclosure and maintain each securely therein by insertion through an associated compartment open end and respective cooperation with either said guide means or said retaining wall portions of said recesses.



4,003,469

CONVOLUTE FOAM PACKAGE

Allan Cameron Findlay, Davidson, N.C., assignor to Reeves Brothers Inc., New York, N.Y.

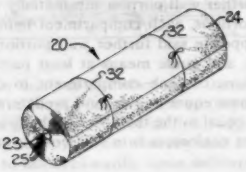
Filed Jan. 29, 1976, Ser. No. 653,488

Int. Cl.² B65D *85/672*

U.S. Cl. 206—410 **6 Claims**

1. A highly compact convolute package of flexible foam sheet material, said package being characterized by substantially uniform layer to layer compression within predeter-

mined limits consistent with the desired compression of the overall package and without detrimental over-compression of any layers, and by substantial self-restraint against circumferential expansion to facilitate handling and unwinding thereof, and the sheet material thereof being characterized by substantial dimensional stability in the length and width directions so as to permit use of the sheet material, for example, immediately upon the subsequent unwinding thereof in the formation of components of predetermined size, said package having a predetermined length of highly compressible, flexible foam



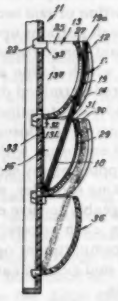
sheet material arranged in a plurality of convolute layers, said layers being substantially wrinkle-free, and having a width dimension closely corresponding to the width of the sheet material in unwound non-compacted form, the thickness of said layers being substantially uniform from layer to layer within said predetermined limits and being substantially less than three-quarters of the thickness of the non-compacted sheet material and the volume of said package being substantially less than nine-sixteenths the volume the package would occupy in a non-compacted, convolutely wound form.

4,003,470

PAINT CHIP DISPLAY STRUCTURE

Joseph S. Lagorio, Arlington Heights, and Marvin G. Kuhlman, Desplaines, both of Ill., assignors to National Creative Merchandising Corporation, Arlington Heights, Ill.

Filed Mar. 15, 1976, Ser. No. 666,773
Int. Cl.² A63F *1/10*
U.S. Cl. 211—50 **19 Claims**



1. A paint chip display structure comprising:

a plurality of pocket members arranged to define a series of vertically spaced forwardly and upwardly opening pockets; and

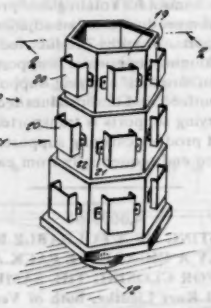
edge retainer means on said pocket members for receiving the side edges of a paint chip extending upwardly from a subjacent pocket wth the lower portion of the paint chip removably carried by the subjacent pocket member and the upper portion of the paint chip releasably retained by said edge retainer means to be exposed forwardly of the pocket member overlying the subjacent pocket member for receiving from forwardly and upwardly thereof.

4,003,471

REVOLVING MESSAGE HOLDER

Elinor S. Alfano, 13833 Samoa Road, San Leandro, Calif. 94577

Filed Dec. 29, 1975, Ser. No. 644,973
Int. Cl.² A47F *7/00*
U.S. Cl. 211—56 **1 Claim**



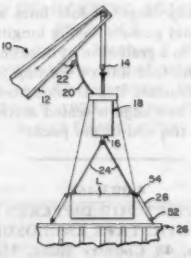
1. In a revolving message holder, a combination of a stationary stand, and a rotatable rack, supported upon said stand, said stand including a base having a thrust bearing upon which as platform is rotatably carried, said platform carrying said rack, said rack being comprised of a plurality of frames stacked one upon another, each of said frames having a plurality of panels arranged in a circle, an outer side of each said panel having a message box attached thereto, each said message box being open at its upper end for placement of messages thereinto, said box being vertically slideable within a slot of said frame panel, an upwardly, forwardly, arcuate plate secured upon a front side of said frame panel, a vertically slideable tray within said box, said tray resting upon one end of a lever, which at its other end is pivotable about a bearing secured to the front side of said frame panel, and the underside of said box bearing against the underside of said lever in the vicinity of said pivot.

4,003,472

CRANE HOOK HEAVE COMPENSATOR AND METHOD OF TRANSFERRING LOADS

Thomas J. Reynolds, Lake Stevens, and James P. Blanchet, Arlington, both of Wash., assignors to Western Gear Corporation, Everett, Wash.

Filed Nov. 10, 1975, Ser. No. 630,359
Int. Cl.² B66C *23/52*
U.S. Cl. 212—3 **12 Claims**



1. In a load handling system for moving a heavy load between two platforms, at least one of which is floating and subject to heaving motion relative to the other,

a heave compensator including cylinder means and piston means slidably mounted thereon and including a piston rod, one of said means being adapted to be connected to the load hook of a crane on one such platform and the other to a load to be lowered onto the other such platform, and

snubber means carried by said other means of the heave compensator and being adapted to be connected to said

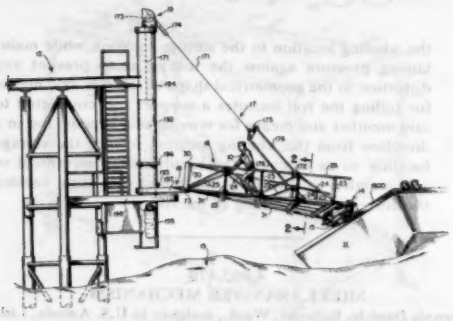
other platform and to the load for resisting upward movement of the load relative to such other platform.

4,003,473

COMBINED MARINE RAMP TRANSFER AND MOORING SYSTEM

William J. Ryan, Loreauville, La., assignor to Ryan Ramp, Inc., Harahan, La.

Filed Aug. 30, 1974, Ser. No. 501,991
Int. Cl.² B63B *21/00*
U.S. Cl. 214—14 **36 Claims**



1. A marine ramp transfer system, wherein personnel and/or material are to be transferred between two relatively moving objects, such as for example a marine vessel and a fixed structure or another vessel at sea, capable of use in both calm and rough weather conditions, comprising the following mechanical elements:

elongated ramp means of significant width being at least connectable between said relatively moving objects for supporting the personnel or material during the transfer between the objects and for producing a gradual transition for the personnel or material in the amount of relative motion between the objects being accomodated, said ramp means including -

at least two opposed, at least relatively stiff, longitudinal stringer members separated from each other in a lateral direction a significant distance and extending the length of said ramp means, said stringer members being rigid when in use;

at least two lateral means connected across said stringer members for supporting a deck surface; and

deck surface means connected between said stringer members and supported by said lateral means for providing a support surface on which the personnel or material are transferred;

said stringer members being substantially fixed in separation distance between each other but movable with respect to each other in a longitudinal, "vertical" plane, and the ends of each said lateral means with each said deck surface area being independently rotatable or otherwise moveable about a longitudinal axis in their respective connections to said stringer members, whereby said ramp means is flexible along its length in a lateral plane; and

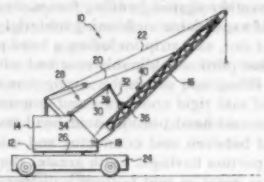
two, separate ramp connection means each for connecting a respective end of said ramp means through said stringer members to one of the relatively moving objects for causing its respective end of the ramp means to assume a lateral direction the same alignment as that of the major "horizontal" plane of the object, the lateral alignment of at least one of which objects is changing with respect to the other in their relative movement; whereby said ramp means through its flexible structure and its end connections gradualize the relative motion between the objects in a directly proportional manner.

4,003,474

CRANE BOOM STOP ARRANGEMENT

Ralph Mooney, 3100 Eldogor Lane, New Castle, Pa. 16105

Filed May 5, 1975, Ser. No. 574,575
Int. Cl.² B66C *23/06*
U.S. Cl. 212—59 A **1 Claim**



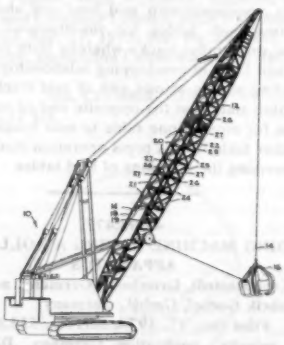
1. In a crane having a frame, an elongated boom pivotally connected to said frame for movement in a vertical plane, and a boom stop arrangement comprised of a compression strut pivotally connected at one of its ends to said frame at a point remote from the boom pivotal connection and a link strut pivotally connected to the other end of said compression strut and to said boom, the improvement wherein said compression strut comprises an extensible member having first and second sections in telescoping relation to one another, the arrangement being such that said compression strut is fully retracted throughout the operating range of boom movement and extends as said boom is moved below the lower limit of said operating range, the improvement being further characterized in that said first section of said compression strut is pivotally connected to said frame and a connector member is provided pivotally connecting said second section of said compression strut to said link strut, said first section having an end portion abutting said connector member when the angle of elevation of said boom is within said operating range.

4,003,475

CRANE BOOM LATTICE AND HOIST LINE PROTECTION ASSEMBLY

Charles A. Brolin, Cedar Rapids, Iowa, assignor to FMC Corporation, San Jose, Calif.

Filed Nov. 27, 1974, Ser. No. 527,562
Int. Cl.² B66C *23/62*
U.S. Cl. 212—144 **2 Claims**



1. In a crane having a boom, a hoist line extending along said boom thereadjacent, said boom including spaced transverse elongate lattice members vulnerable to damage by impacting movement of the hoist line thereagainst,

the improvement therein comprising a lattice and hoist line protection assembly mounted upon each said vulnerable lattice member,

said protection assembly including an elongate rigid connector disposed parallel to each said lattice member and extending longitudinally thereof,

said rigid connector having a bottom wall, spaced side walls extending from said bottom wall and defining a longitudinal receiving slot, spaced legs depending from said bottom wall along the length thereof, means connecting said legs to said lattice member, thereby reinforcing said lattice member against bending forces, and,

a strip of expendable cushioning material slidably received in said slot, said strip including a head portion, a mounting base portion retainably received within and substantially filling said slot to be contiguous with said bottom wall of said rigid connector and connected through said slot to said head portion, said head portion being positioned between said connector and said hoist line, said head portion having a width greater than said slot and at least as great as said bottom wall thereby to form a replaceable shock-absorbing cushion to receive wear from said hoist line.

4,003,476

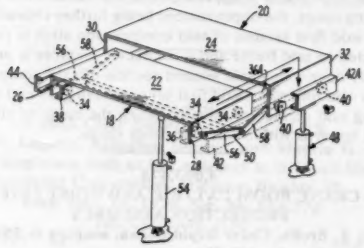
PRESS LOADER

Ben G. Laskey, Redwood City, Calif., assignor to Benruth Engineering & Manufacturing Company, Inc., Redwood City, Calif.

Filed Nov. 21, 1975, Ser. No. 634,026

Int. Cl.² B65G 47/74

U.S. Cl. 214—1 BB **5 Claims**



1. A press loader comprising in combination:

a. a first table having long flanges at both ends thereof,

b. a second table having short flanges at both ends thereof,

c. means associated with said long and short flanges for mounting both tables for simultaneous reciprocating motion on parallel tracks whereby both tables can slide back and forth in overlapping relationship,

d. a loading station at one end of said tracks and a press operation station at the opposite end of said tracks,

e. means for moving one table to said loading station and the other table to said press operation station and means for reversing the positions of said tables.

4,003,477

REWINDING MACHINE HAVING A ROLL TRANSFER APPARATUS

Dietmar Kroppenstedt, Griesheim, Germany, assignor to Maschinenfabrik Goebel, GmbH, Germany

Filed Dec. 17, 1974, Ser. No. 533,625

Claims priority, application Germany, Dec. 21, 1973, 2363861

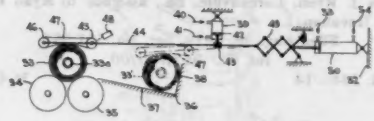
Int. Cl.² B65G 3/00

U.S. Cl. 214—1 QB **8 Claims**

1. An apparatus for transferring a roll of wound material from a winding location to a storage location in such a manner so as to preserve the geometrical shape of the roll by preventing funnel formation of individual wound layers of the roll, the apparatus comprising:

means for applying pressure against the circumference of the roll, said means for applying pressure including a movable belt and means for urging said belt into contact with the surface of the outer layer of the roll, said means for urging said movable belt incluing a rotatable member and means for pressing said rotatable member towards the circumference of the roll;

and means for rolling the roll at a predetermined speed from



the winding location to the storage location while maintaining pressure against the roll so as to prevent any distortion in the geometrical shape of the roll, said means for rolling the roll includes a support rod connected to said member and means for moving said support rod in a direction from the winding location toward the storage location so as to cause the simultaneous movement of said member in such direction thereby, in turn, causing the corresponding rolling of the roll.

4,003,478

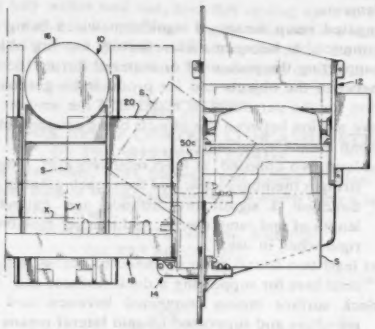
SHEET TRANSFER MECHANISM

Dennis Daniels, Bellevue, Wash., assignor to U.S. Amada, Ltd., City of Industry, Calif.

Division of Ser. No. 393,891, Sept. 4, 1973, Pat. No. 3,898,904. This application Mar. 6, 1975, Ser. No. 555,831

Int. Cl.² B26D 7/06

U.S. Cl. 214—1 BB **3 Claims**



1. A transfer arm mechanism for moving sheets of self form-sustaining material from a first machine in which a sheet is movable in a Y axis direction to a second machine comprising a base, means for supporting the base on the first machine at a location on the first machine adjacent to the second machine, a transfer arm pivotally mounted on said base, a sheet clamp on said transfer arm, means for pivoting said transfer arm between a first position on said base of said first machine and a second position on said base and extending over said second machine for passing a sheet from the first machine to the second machine, and releasable means for accurately locating the transfer arm on said base in said first position so that the sheet can be accurately engaged relative to the first machine and for accurately locating the transfer arm in said second location on said base and relative to said second machine so that the sheet can be accurately located on the second machine when carried to the second machine, said first machine including numerically controlled sheet positioning means for reciprocably positioning a sheet on said first ma-

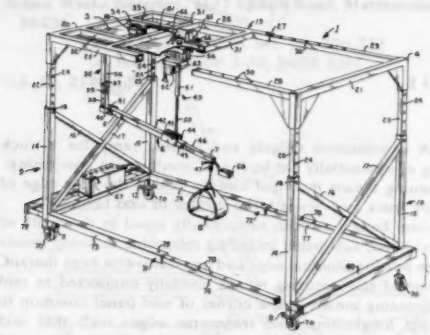
chine in the Y axis and said base being connected to said reciprocable sheet positioning means at a location adjacent said second machine, whereby accurate movement of said transfer arm along said second machine is obtained by said reciprocable sheet positioning means of said first machine.

4,003,479

HOIST AND TRANSPORTING APPARATUS

William J. Reyer, 1312 Polk St., Box 103, Topeka, Kans. 66612

Filed June 4, 1975, Ser. No. 583,624
Int. Cl.² B25J *3/00*
U.S. Cl. 214—1 D **9 Claims**



1. A hoist and transporting apparatus for moving disabled persons as between a bed and chair comprising:

a. a frame structure having a support deck in an elevated position for use over a disabled person support, said frame structure including a plurality of generally upright legs operatively supporting said support deck;

b. a mounting member in depending relation to said support deck and rotatably carried thereby for rotation about a vertical axis, said mounting member having an elongate arm depending therefrom in spaced relation to said vertical axis, said arm having a lower end spaced below the mounting member and above a person to be moved;

c. an elongate boom having one end portion pivotally mounted on said arm adjacent the lower end thereof for up and down movement, said boom extending from said arm beyond said vertical axis and having a free end portion movable to a position generally over a person to be moved;

d. means connected to said boom free end portion and having a body support member for receiving a person;

e. powered means operatively connected to said mounting member and said boom in spaced relation to the pivoted end thereof for selectively moving said boom to raise and lower a person received by the body supporting member; and

f. powered means operatively connected to said frame structure and said mounting member for selectively rotating said mounting member relative to said support deck and move the boom and the body supporting member about said vertical axis.

4,003,480

APPARATUS FOR LOADING SHIPS OR BARGES

Michel Metrier, 20, Parc de Bearn, Saint Cloud, France (92210)

Filed Dec. 23, 1975, Ser. No. 643,924
Claims priority, application France, Dec. 24, 1974, 74.42669
Int. Cl.² B65G *67/58*
U.S. Cl. 214—14 **3 Claims**

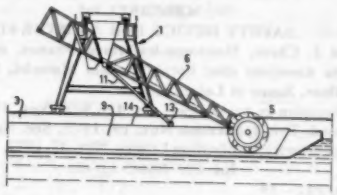
1. An apparatus for unloading marine or fluvial transport cargo vessels, of the type constituted by endless pick-up means, such as bucket wheels, a gantry, a jib articulated on said gantry and supporting the pick-up means for outwardly evacuating the bulk material unloaded from the floating vessel by the pick-up means, wherein said apparatus comprises:

driving means adapted to move the gantry along the vessel so as to unload successively the whole length of the vessel;

a sensor member mounted on the gantry for determining the position in height of the vessel in the course of unloading with respect to the gantry;

gantry control means permanently the information from said sensor member concerning the position in height of the vessel during unloading;

manually operable means adapted to inform said gantry



control means as to the characteristic data of the vessel such as the depth of hold thereof;

said gantry control means being able to integrate these data, according to a determined program, in order to control the angular positioning of the jib which supports the endless pick-up means, thereby making it possible to cut into the surface of the material to be unloaded;

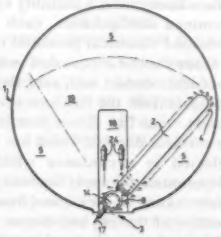
said sensor member being constituted by a rod articulated at a first end thereof on the gantry as to be angularly movable with respect to the gantry, said rod being displaceable with the gantry with respect to the vessel, the second end of said rod resting freely by gravity on a ledge of the vessel, said rod following substantially the same direction with respect to the jib and being of such a length as to rest on said edge of the vessel substantially along the length of the vessel where said pick-up means are in operation.

4,003,481

BOTTOM UNLOADER FOR A STORAGE CONTAINER

Sidney Ernest Proctor, High Wycombe, England, assignor to Austin Hoy and Company Limited, High Wycombe, England

Filed Apr. 11, 1975, Ser. No. 567,431
Claims priority, application United Kingdom, Apr. 17, 1974, 16866/74
Int. Cl.² B65G *65/42*
U.S. Cl. 214—17 DA **5 Claims**



1. A bottom unloader for a storage silo comprising a sweep arm conveyor carrying an endless cutting and conveying chain, an unloader frame arranged below the sweep arm and for reception in a radial trough in the base of the silo, a pivotal

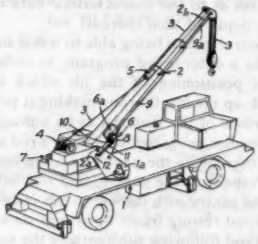
mounting for the sweep arm, the pivotal mounting comprising a bearing ring fixed to the sweep arm and which is rotatably mounted on a spigot provided on the unloader frame, drive means for the sweep arm conveyor chain and which is co-axial with the pivotal mounting, and a pair of fluid actuated rams mounted below the sweep arm on the unloader frame and connected to the bearing ring to cause swinging of the sweep arm about the spigot, whereby the sweep arm can be pivoted adjacent to the silo wall and can be swung across the base of the silo to cut and remove material therefrom.

4,003,482

SAFETY DEVICE FOR A CRANE

Bernard J. Cheze, Montceau-les-Mines, France, assignor to Societe Anonyme dite: Potain Poclain Materiel, Montceau-les-Mines, Saone et Loire, France

Continuation-in-part of Ser. No. 416,848, Nov. 19, 1973, abandoned. This application Nov. 19, 1975, Ser. No. 633,600
Claims priority, application France, Nov. 27, 1972, 72.42099
Int. Cl.² B66C *13/48*
U.S. Cl. 212—39 **6 Claims**



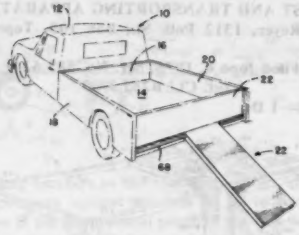
1. A safety device for a crane having a chassis, and an extensible jib pivotally mounted on said chassis for pivotal movement in a vertical plane, said crane including means on the jib for raising and lowering a load, said device comprising means for producing a first signal indicative of the actual load in any configuration of said jib with respect to the chassis of the crane, means for producing a second signal proportional to the critical load above which the crane may tilt at substantially every position which can be assumed by said jib with respect to said chassis, said second signal producing means comprising at least one sensor means operatively connected to said jib for following the movement of the point at which the load is applied to the crane and assuming positions representative of that point corresponding respectively to the instantaneous vertical angular position and extension of the jib, at least one flat surface comprising a plurality of conductive flat zones of predetermined configuration, each of which is at a different predetermined electrical potential representative of different critical loads for the crane, said sensor means being in permanent electrical contact with said flat surface to produce said second signal from the flat zone it is in contact with at any given instant, said flat zones forming a network of critical isocharge surfaces each of which has a predetermined configuration selected in accordance with their predetermined electrical potential to apply to said sensor means a signal which is proportional to the critical load for the crane at each possible position of the jib, and means operatively connected to said first and second signal producing means for comparing said first and second signals and producing a third signal when said first signal is greater than said second signal whereby said third signal provides an indication that the actual load on the crane is greater than the permissible critical load for the instantaneous position of the crane's jib.

4,003,483

COMBINATION TAILGATE AND LOADING RAMP

Loyd R. Fulton, 24222 54th West, Mountlake Terrace, Wash. 98043

Filed July 14, 1975, Ser. No. 595,735
Int. Cl.² B65G *67/02*
U.S. Cl. 214—85 **12 Claims**



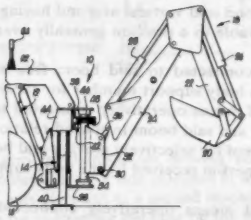
1. A combination tailgate and loading ramp for a truck having a substantially flat bed, said combination comprising:
fastening means mounted closely behind the rear edge of the truck bed beneath the surface of said bed; and
a panel having a width substantially equal to the width of said bed, said panel including releasable securing means on one longitudinal edge and one transverse edge thereof, one of said securing means pivotally connected to said fastening means at the corner of said panel common to said longitudinal and transverse edges such that said panel may be rotated between a position where said longitudinal edge is connected to said fastening means to form a tailgate enclosing the rear of said bed, and a position where said transverse edge is connected to said fastening means to form a loading ramp with said transverse edge flushly meeting the surface of said bed.

4,003,484

SWING MECHANISM FOR IMPLEMENT BOOM

Joel Flynn Jones, and Thomas Earl Spain, both of Claremore, Okla., assignors to Hesston Corporation, Hesston, Kans.

Filed Feb. 28, 1975, Ser. No. 554,174
Int. Cl.² B66F *9/00*
U.S. Cl. 214—138 E **8 Claims**



1. In an implement having a frame and a boom journaled on the frame, mechanism for swinging said boom relative to the frame comprising:
a pair of spaced-apart members secured to said boom on its axis of swinging movement,
each of said members having an outer periphery concentric with said axis;
a bar shiftably mounted on said frame for reciprocation transversely of said axis;
a first flexible drive element interconnecting the periphery of one of said members and one end of said bar;
a second flexible drive element interconnecting the periphery of the other of said members and the opposite end of said bar,

said members being engaged by said elements from opposite directions; and

a single, double-acting power device only between said frame and the bar for reciprocating the latter to swing the boom,

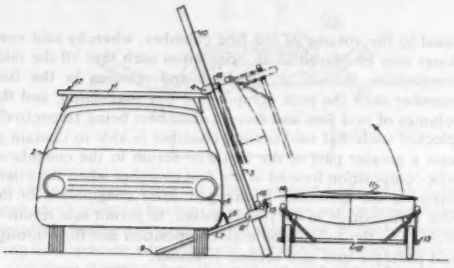
said frame including an upright, apertured plate having a track for the bar on the one side thereof facing the boom, said power device located on the opposite side of said plate and being coupled with said bar through the aperture in said plate.

4,003,485

VEHICLE-TOP LOADER

Nelson Weeks Edgerton, 1112 Middle Road, Martinsville, N.J. 08836

Filed July 17, 1975, Ser. No. 596,733
Int. Cl.² B60P *3/10*; B60R *9/04*
U.S. Cl. 214—450 **2 Claims**



1. A vehicle-top loader and carrier comprising:

a rack adapted to be supported on the top of said vehicle;

a carriage adapted to cooperate with said rack to enable rotation from an inclined loading position alongside said vehicle to the level of said rack and subsequent horizontal movement across said rack to the travelling position above said vehicle, said carriage being adapted to support a boat; and

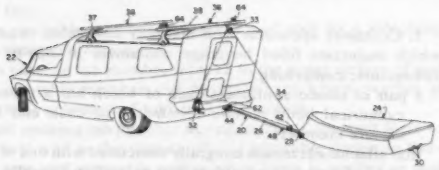
a lever comprising the mast of said boat extendably attached to said carriage to enable withdrawal of said lever in a direction away from said vehicle thereby providing increased leverage to raise said carriage to said rack level.

4,003,486

APPARATUS FOR LOADING AND UNLOADING A BOAT ONTO A MOTOR VEHICLE

Clifford L. Shoemaker, 20632 3rd Ave. S., Seattle, Wash. 98148

Filed Aug. 11, 1975, Ser. No. 600,617
Int. Cl.² B60P *3/10*
U.S. Cl. 214—450 **11 Claims**



1. A loading device, to be mounted on the rear bumper of an automobile or other carrier vehicle, for raising a boat from ground level and positioning it on a rack on the roof of said vehicle, operable by one person without requiring him to manually lift or support the weight of the boat, comprising:

a. a telescoping support beam, adjustable in length, lockable at a fixed, pre-selected length and pivotally connected at one end to the rear structure of a carrier vehicle;

b. a bracket, to be attached to a boat stern to accept the extended end of the telescoping support beam at a pivotal connection;

c. a bracket, to be attached to a boat bow to accept the extended end of the telescoping support beam at a pivotal connection; and

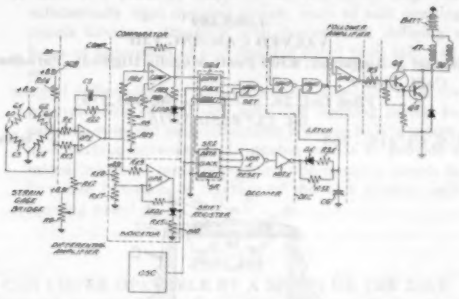
d. a winch and its associated pulleys and pull rope to raise the boat as it is restrained and partially supported by the telescoping support beam.

4,003,487

TRUCK OVERLOAD PROTECTIVE SYSTEM HAVING TRIP SIGNAL SAMPLING MEANS

Terry R. Downing, Hazel Crest, Ill., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Apr. 3, 1975, Ser. No. 564,720
Int. Cl.² B65E *47/00*
U.S. Cl. 214—673 **21 Claims**



21. An overload protective system for a vehicle having a frame and a lift mechanism including a shiftable load support for raising and lowering loads and including a load carrying member and power means applied to said frame for operating said lift mechanism to shift said load support on said vehicle, said load carrying member being subjected to the force exerted by said power means and resisting the tilting moment acting on said vehicle as a result of the position of said load support on said vehicle, strain gage sensor means attached to said member for sensing the mechanical strain in said load carrying member and generating a strain signal whose magnitude is a function of said mechanical strain, comparator means for deriving a trip signal when said strain signal reaches a predetermined magnitude indicating that said lift mechanism is overloaded, sampling means for repetitively sampling the output of said comparator means over a time interval and for deriving a disable signal output only when said trip signal is present for a predetermined time interval, and means responsive to said disable signal output for preventing said power means for operating said lift mechanism in a load raising direction.

4,003,488

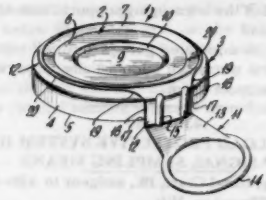
TEAR OPEN BOTTLE CAP

Thomas G. Moller, Rahway, N.J., assignor to American Flange & Manufacturing Co., Inc., Linden, N.J.

Continuation-in-part of Ser. No. 581,881, May 29, 1975. This application Mar. 15, 1976, Ser. No. 667,266
Int. Cl.³ B65D *41/42*
U.S. Cl. 215—254 **5 Claims**

1. A lightweight metal tear-off cap comprising a circular top panel surrounded by a cylindrical skirt terminating in a lowermost free edge, a radiused juncture portion connecting said top panel and said skirt, a gripping ear formed as an integral part of said skirt extending from said free edge, a tearing zone commencing at said skirt free edge adjacent said gripping ear and extending upwardly across said skirt and blending into a circular path lying within said radiused juncture portion, said tearing zone extending rearwardly from said gripping ear to at

least partially surround said cap top panel and a sealing gasket adhesively affixed to said cap interior disposed radially inwardly of said tearing zone along said path whereby tearing



along said exposed tearing zone independently of said gasket causes the major portion of said cap top panel to be separated from said cap skirt upon opening.

4,003,489

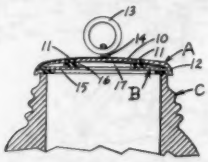
VALVED CANNING LID

Harold J. Bingaman, 6309 Pentz-Magalia Highway, Paradise, Calif. 95969

Filed Oct. 24, 1975, Ser. No. 625,376

Int. Cl.² B65D *51/16*

U.S. Cl. 215—260 **2 Claims**



1. A canning jar sealer lid incorporating a mechanical relief valve and a means for operating the relief valve manually when said lid is secured to a jar with a conventional screw band, comprising: a sectional lid circular in shape, the lid having two sections including a flexible external sealer cap and a rigid internal sealer disc, the cap having a pull ring affixed by a pivot hinge and centered in the upper surface of the cap, this center pull ring surrounded by a circle of small openings cut through the cap material with the outer edge of the cap flanged downward to form a retaining rim containing an area slightly larger than the total circumference of the disc, the disc having a single aperture through the center with a gasket adhered around the aperture on the upper surface of the disc and a gasket adhered on the lower surface of the disc adjacent the outer circumference of the disc, the upper gasket around the disc aperture being in the same circular position as the holes through the cap, the two sections designed to cojoin into a single sealer lid.

4,003,490

PROCESS AND APPARATUS FOR THE MANUFACTURE OF WHITE CHEESE OR YOGHURT

Bernadette Corbic née Busnel, Carrieres-sur-Seine, France, assignor to Societe: Toscara Anstalt, Vaduz, Liechtenstein

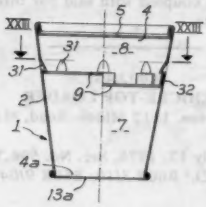
Filed Dec. 23, 1974, Ser. No. 535,843

Claims priority, application France, Jan. 9, 1974, 74.00718; Apr. 10, 1974, 74.12664

Int. Cl.² B65D *85/00;* **B01D** *43/00*

U.S. Cl. 220—22.3 **10 Claims**

1. A container for use in the manufacture of white cheese or yoghurt, which comprises a container having a side wall defining a sealable filling opening through which a coagulatable milk composition may be introduced into the container, a sealable removal opening, and first and second communicating chambers in the container respectively located adjacent said filling and sealing openings, and a divider having an edge at least partly engaging the side wall of the container and dividing the container into the two chambers, the edge of the divider having a predetermined configuration selected to cooperate with the side wall of the container to define passages therebetween providing communication between said chambers, of a predetermined size to prevent coagulated milk composition from passing therethrough; seal means for sealing the filling opening of the container after a milk composition has been introduced into the container in an amount at most



equal to the volume of the first chamber, whereby said container may be placed in an orientation such that all the milk composition therein accumulates and remains in the first chamber until the milk composition has coagulated, and the volumes of said first and second chambers being respectively selected such that said second chamber is able to contain at least a greater part of the liquid or serum in the coagulated milk composition formed in the first chamber when the orientation of the container is changed, after coagulation of the milk composition in the first chamber, to permit said serum to drain from the caogulated milk composition and flow through said passages into said second chamber.

4,003,491

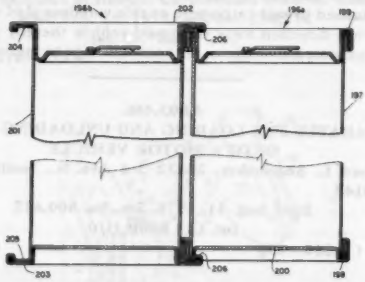
SYSTEM OF INTERCONNECTING CONTAINERS

Robert A. Wells, 4450 Harris Trail NW., Atlanta, Ga. 30327, and Carl J. Strobe, 2831 Orchard Knob, Atlanta, Ga. 30309

Division of Ser. No. 477,821, June 10, 1974, abandoned. This application Nov. 12, 1975, Ser. No. 630,988

Int. Cl.² B65D *21/02*

U.S. Cl. 220—23.4 **6 Claims**



1. Container apparatus with mutually engagable structure which maintains filled beverage containers in side-by-side connection, comprising:

a pair of closed containers each of which has a generally cylindrical body portion terminated at each end by a closure member;

first attachment means integrally associated with one of said ends of one said container and extending laterally outwardly from said cylindrical body portion ,

second attachment means integrally associated with said other container in peripheral surrounding relation therewith and presenting an engagement portion facing laterally outwardly from said cylindrical body portion of said other container;

one of said attachment means defining a circumferential channel which extends longitudinally a distance along the body portion of the corresponding container; and

the other of said attachment means having a configuration which is complementary to said channel and which is laterally retained within said channel for snap-out removal thereform, to selectively retain said pair of containers in lateral connection relations.

4,003,492

CONTAINER BODY SIDE SEAM CONSTRUCTION

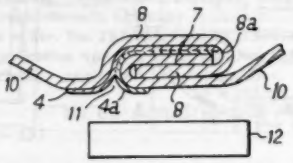
John Beveridge, Uxbridge; Thomas Roderick Harries Davies, Pinner; Fred Fidler, Cuffley, and Maurice Frank Ring, Epsom, all of England, assignors to Metal Box Limited, Reading, England

Filed Nov. 14, 1974, Ser. No. 523,928

Claims priority, application United Kingdom, Nov. 28, 1973, 55171/73

Int. Cl.² B65D *7/38*

U.S. Cl. 220—62 **4 Claims**



4. A body blank for a tubular container body which comprises sheet material having opposite edges and opposite sides, oppositely facing and inter-engageable hook portions formed along said opposite edges thereof, and adhesive strips attached to said sheet material along the said opposite edges thereof, all of said adhesive strips being on a single one only of said material sides for bonding together to form a seal between said hook portions when inter-engaged to form a container body.

4,003,493

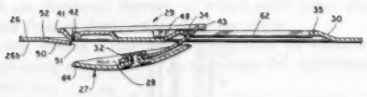
EASY-OPEN CONTAINER WITH NONDETACHABLE OPENING MEMBER

Robert A. Wells, 4450 Harris Trail NW., and Carl J. Strobe, 2831 Orchard Knob, both of Atlanta, Ga. 30327

Continuation-in-part of Ser. No. 580,624, May 27, 1975. This application Dec. 9, 1975, Ser. No. 639,167

Int. Cl.² B65D *41/32*

U.S. Cl. 220—267 **24 Claims**



1. An easy opening container, comprising:

a container wall having an outer surface and an inner surface;

an openable member defined in said wall by a selectably separable region;

an opening tab member secured to the outer surface of said openable member and having means which overlies at least a portion of said separable region;

said opening tab member having means to transmit force to said wall in the vicinity of said separable region to fracture said separable region when force is applied to said opening tab member in a direction toward said wall; and

said overlying means being configured to allow said openable member to move a predetermined limited distance inwardly from said wall when said separable region becomes separated, and being movable with said opening tab member along said outer surface of said wall to displace said openable member along said inner surface of said wall.

4,003,494

SHEET METAL CONTAINER COMPONENT

George L. Smith, New Kensington, and Milton L. Stineman, Shelocta, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Jan. 14, 1976, Ser. No. 648,904

Int. Cl.² B65D *17/00*

U.S. Cl. 220—268 **11 Claims**

1. A sheet metal container component having a generally planar wall comprising:

at least two inwardly displaceable, adjacently disposed, substantially rigid opening panels, each of said opening panels having a frangible web therearound defining a locus of separation of said opening panel from said wall, and

integral deflectable portions projecting outwardly from the general plane of said wall with said opening panels located therein and said deflectable portions having a common surface between said opening panels to provide a raised bridge of metal separating the opening panels to facilitate initiation of fracture of the web around each opening panel.

4,003,495

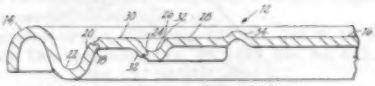
CAN COVER OPENABLE BY A SPOON OR THE LIKE

Frederick Gerard Joseph Grise, Osterville, and Walter Carl Lovell, Wilbraham, both of Mass., assignors to USM Corporation, Boston, Mass.

Filed Apr. 26, 1976, Ser. No. 680,578

Int. Cl.² B65D *41/32*

U.S. Cl. 220—268 **12 Claims**



1. A sheet metal can end comprising a relatively liftable panel defined by a tear line, the panel including and encompassing a tongue-like closure portion openable by relative depression, the closure portion being defined at least in part by an arcuate weakening line characterized by at least a mid-portion thereof being fractured but integral with the panel, said mid-portion being spaced inwardly from said tear line by a lip substantially coplanar with the panel and the lip tapering narrower adjacent said mid-portion of the weakening line than at other portions thereof.

4,003,496

END CLOSURE FOR CONTAINER

Obert M. Ostrem, Westmont; Donald F. Kulikowski, Oak Forest, and Sam C. Pulciani, Norridge, all of Ill., assignors to The Continental Group, Inc., New York, N.Y.

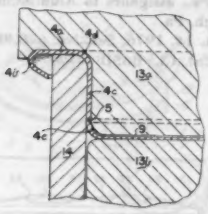
Filed Feb. 17, 1976, Ser. No. 658,446

Int. Cl.² B65D *41/32*

U.S. Cl. 220—270 **1 Claim**

1. An improved end panel for an easy-opening end closure of the full opening type comprising a central web, and a peripheral portion, said peripheral portion including a substantially axial chuckwall for placement in close association with the sidewall of a can or similar container, the improvement comprising a scoreline disposed in the outer surface of said

chuckwall and formed and arranged to provide a removable flap which upon opening leaves a severed sharp edge on the



chuckwall offset from the inner surface of said chuckwall toward the container sidewall subsequent to opening of the closure in a downwardly axial position.

4,003,497

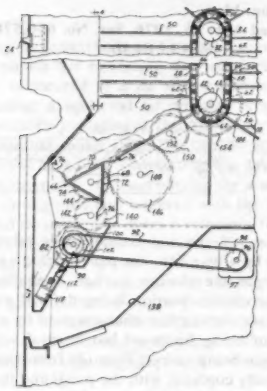
DELIVERY SYSTEM FOR FIFO MERCHANDISING MACHINE

Albert Kurimsky, Dover, N.J., assignor to Rowe International Inc., Whippany, N.J.

Continuation of Ser. No. 210,380, Dec. 21, 1971, abandoned. This application Aug. 10, 1973, Ser. No. 387,327

Int. Cl.² G07F *11/82*

U.S. Cl. 221—84 **15 Claims**



1. In a merchandising machine, apparatus including a frame, an escrow member having an article receiving surface, a shelf having an article supporting surface, means including first and second shafts respectively mounting said escrow member and said shelf for movement between first positions at which said surfaces cooperate to support an article of merchandise and second positions at which said article is released, a gear train comprising first and second gears carried respectively by said first and second shafts for connecting said shafts, said gear train adapted to be driven concomitantly to drive said shafts in opposite directions, and means responsive to operation of said machine for driving said gear train to move said escrow member from its first position to its second position, the gear ratio provided by said gear train being such that the shelf moves from its first to its second position as said operation responsive means drives said gear train.

4,003,498

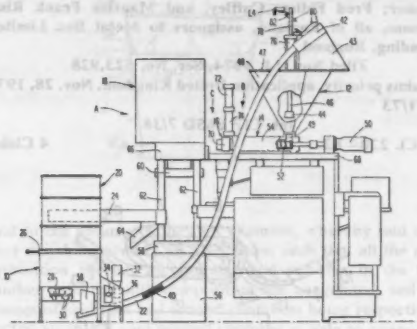
METHOD AND APPARATUS FOR CONTROLLED FEEDING OF FRICTION MATERIAL

Edward Moneghan, Hatboro, Pa., assignor to Pennwalt Corporation, Philadelphia, Pa.

Division of Ser. No. 633,054, Nov. 18, 1975. This application Dec. 5, 1975, Ser. No. 637,914

Int. Cl.² B29F *3/02*; B29C *3/00*

U.S. Cl. 222—1 **14 Claims**



8. A method for feeding high bulk friction materials and the like into contact with a rotating plasticizing screw comprising the steps of:

a. forcing material from a storage hopper through an orifice and into contact with said screw;

b. timing at least a portion of the preceding step (a);

c. transporting material from a supply container, remote from said screw, to said storage hopper; and

d. regulating the transport of material performed in preceding step (c) whenever the timed portion of step (a) timed in step (b) exceeds a first predetermined time period.

4,003,499

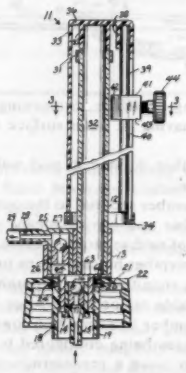
PRECISION LIQUID DISPENSING DEVICE

Justin Joel Shapiro; Marion Henrietta Shapiro, both of Berkeley, and John W. G. Chin, Richmond, all of Calif., assignors to Justin Joel Shapiro, Berkeley, Calif.

Filed May 26, 1976, Ser. No. 690,274

Int. Cl.² B67D *5/22*

U.S. Cl. 222—50 **10 Claims**



1. A burette device comprising a vertical cylindrical barrel provided at its top end with an outwardly projecting stop element, a dispensing plunger slidably and sealingly received in said barrel, a volumetric scale on said barrel, a guard shield

secured to the top end of said plunger and surrounding said barrel, said guard shield being formed with a window aperture exposing said volumetric scale, a depending vertical rod in the guard shield secured to the top portion of said guard shield and depending adjacent said window aperture, an indicator element adjustably mounted on said vertical rod and having a portion thereof transversely overlying said scale and located beneath said stop element so as to engage therewith to limit upward extension of said plunger, a valve assembly including an intake conduit provided with suction check valve means and an outlet conduit having discharge check valve means, means communicatively connecting said valve assembly with the bottom end of said barrel, and means to mount said valve assembly on a closure element of a liquid container with said intake conduit projecting downwardly therefrom.

4,003,500

METERING DEVICE

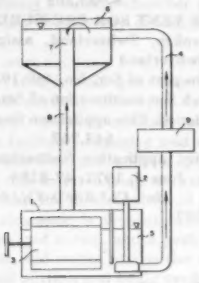
Eberhard Schornig, Bleidenstadt, Germany, assignor to Hoechst Aktiengesellschaft, Germany

Continuation of Ser. No. 213,041, Dec. 28, 1971, abandoned. This application Apr. 18, 1975, Ser. No. 569,500

Claims priority, application Germany, Dec. 31, 1970, 2064709

Int. Cl.² B67D *5/56*

U.S. Cl. 222—133 **5 Claims**



1. A developing apparatus for use in a copier operating on the electrostatic imaging principle, which apparatus comprises means defining a developer flow path including pump means for circulating, around the path, a developer fluid composed of a high-resistance liquid phase with a finely-divided solid toner phase dispersed therein, of which solid toner phase the developer fluid is depleted during operation,

metering means comprising a plurality of chambers for containing a solids toner concentrate for replenishing the developer,

means whereby in a fluid-tight manner each chamber can be consecutively introduced, when desired, as a section of said path, thereby entering the contents of any introduced chamber into a developer fluid,

and filling means mounted above the metering means for filling said chambers with said solids toner concentrate.

4,003,501

FLUID IMPINGEMENT MIXING APPARATUS

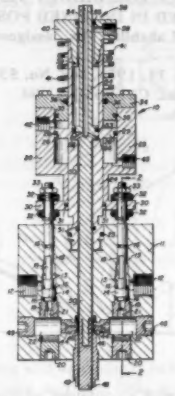
Dario J. Ramazzotti, Tallmadge, and Geza A. Thiry, Ravenna, both of Ohio, assignors to McNeil Corporation, Akron, Ohio

Filed Mar. 12, 1975, Ser. No. 557,574

Int. Cl.² B67D *5/60*

U.S. Cl. 222—135 **8 Claims**

1. Apparatus for mixing a plurality of fluids and thereafter dispensing the same comprising a fluid mixing chamber with at least one separate opening therein from which the fluids are dispensed; at least two nozzle means for emitting fluid to said mixing chamber; a fluid input chamber communicating with each said nozzle means; means to provide fluid under pressure to each said input chamber; said means to provide fluid under pressure including fluid input means, valve means, and means to operate said valve means from a closed to open position, said valve means communicating with said fluid input means and each said input chamber such that when said valve means is in an open position fluid is permitted to flow from said input



means to each said input chamber; said means to operate said valve means including a fluid actuated cylinder having a stationary piston and piston rod and movable cylinder housing, said cylinder housing being connected to said valve means to open and close the same; and means to prevent said nozzle means from emitting fluid to said mixing chamber until after each input chamber receives fluid under pressure.

4,003,502

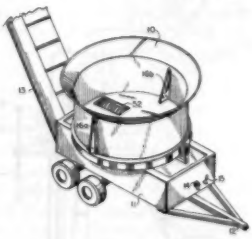
ADJUSTABLE SWEEPING APPARATUS FOR FEED GRINDERS AND THE LIKE

Ernest A. Barcell, Lafayette, Colo., assignor to Easy Engineering Corporation, Broomfield, Colo.

Continuation-in-part of Ser. No. 539,821, Jan. 9, 1975, abandoned. This application Nov. 17, 1975, Ser. No. 632,264

Int. Cl.² B65G *65/48*

U.S. Cl. 222—168 **6 Claims**



1. In a container apparatus having moving sidewalls for urging materials into an aperture, an improvement, comprising:

plate means,

means for attaching moving said plate means to the sidewalls of the container apparatus, and

means selectably moving said plate means between at least a first location wherein said plate means is extended into the container for sweeping over the aperture in response to movement of the sidewall and a second location wherein said plate means is substantially withdrawn from

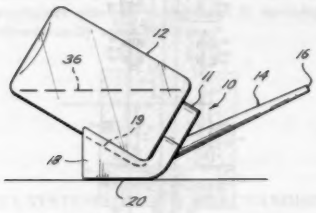
the interior of the container, whereby said plate means when in said first location will augment urging of material within the container towards the aperture but will not interfere with loading of the container when in said second location.

4,003,503

DISPENSING DEVICE FOR HIGHLY VISCOUS LIQUIDS SUPPORTED IN INCLINED POSITION

George E. Aldridge, Lakehills, Tex., assignor to ACCC, Inc., San Antonio, Tex.

Filed Dec. 11, 1974, Ser. No. 531,468
Int. Cl.² B65D *41/04*
U.S. Cl. 222—173 2 Claims



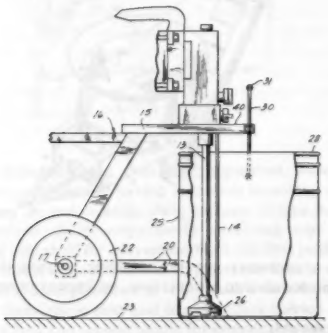
1. In combination with a container adapted to carry a relatively highly viscous liquid, a cap adapted to be secured to said container in a liquid-tight seal, a nozzle on said cap, means on said cap adapted to maintain said container in normally downwardly inclined condition with said cap positioned downwardly, said nozzle extending angularly upward from said cap with respect to the longitudinal axis of said container in downwardly inclined condition, said nozzle terminating upwardly in proximity to the horizontal plane of a predetermined liquid level in said container in normally downwardly inclined condition.

4,003,504

PUMP FRAME

Gerald William Johnson, Minneapolis, and Robert David Lerum, Crystal, both of Minn., assignors to Spray Tech Corporation, Minneapolis, Minn.

Filed Apr. 21, 1975, Ser. No. 569,888
Int. Cl.² B62B *1/06*; F04B *21/00*
U.S. Cl. 222—178 5 Claims



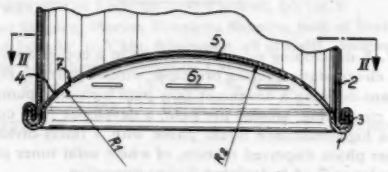
1. A tiltable easily transported wheeled frame for supporting a pump with an intake extending into a removable bail equipped container for material to be pumped wherein the frame may be tilted to swing the intake into bailed container resting on the ground and the bail of the container easily attached to the frame to swingably suspend the container from the frame and avoid spillage of the material therein when the frame is transported which comprises, a pair of laterally spaced wheels, a frame supported on said wheels having forwardly projecting legs adapted to rest on the ground to cooperate with the wheels for holding the frame in an upright position, a pump support means above said legs, and a handle extending rearwardly beyond said wheels adapted to be manually depressed to tilt the frame about the wheels and lift the legs off the ground and pushed or pulled for rotating the wheels to transport the tilted frame, a bail suspension device on said frame forwardly of said wheels adapted to receive the bail of a container therearound and having spaced means underlying the bail with outwardly opening grooves at opposite ends of the device with their bottoms spaced apart a sufficient distance to engage the both sides of the bail in spaced relation from the apex thereof intermediate the pivoted ends of the bails and the apex of the bail and positioned at an elevation on the frame to accommodate the bailed container to be suspended therefrom to rest on the ground when said legs of the frame are on the ground and to lift the container off of the ground for transport with the frame when the handle of the frame is depressed to lift the legs off of the ground, and said suspension device cooperating with said frame to accommodate swinging of a bailed container suspended from said device to avoid tilting of the container to a spilling position when the frame is tilted for transportation.

4,003,505

RELIEF VENT FOR PRESSURIZED CANS

Jean Hardt, Benken, Switzerland, assignor to Aluminium Suisse S.A., Switzerland

Continuation-in-part of Ser. No. 460,193, April 11, 1974, abandoned, which is a continuation of Ser. No. 264,964, June 21, 1972, abandoned. This application Dec. 23, 1975, Ser. No. 643,767
Claims priority, application Switzerland, June 23, 1971, 9163/71; Japan, June 5, 1972, 47-8258
Int. Cl.² B65D *83/14*
U.S. Cl. 222—397 15 Claims



1. A packaging can for pressurized products such as aerosols, comprising a tubular body having closed opposite ends, one of said ends having a dished portion dished inwardly toward the interior of said tubular body and having a generally circular central area deformable outwardly in an axial direction when a predetermined internal pressure is exceeded in said body, said end having a multiplicity of elongated discrete scores corresponding to tearable areas of reduced cross section of a material defining said end, said scores each having a major length component intermediate opposite end portions disposed tangential to the boundary of said circular central area and said material being weakened in said areas of reduced cross section and enabled to progressively tear when the central area is deformed outwardly, said scores being disposed in a circular configuration spaced from each other in a circumferential direction in said circular configuration with the end portions thereof in positions to avoid propagation of tearing from one score to another and each having a length of major component thereof to facilitate outward deforming of said circular central area, whereby when said predetermined internal pressure is exceeded said central area deforms outwardly and at least one of said areas of reduced cross section

progressively tears without propagation of tears between the areas and without rupture of said central area thereby relieving the internal pressure progressively.

4,003,506

CASTER WITH ROTATING CLOSURE

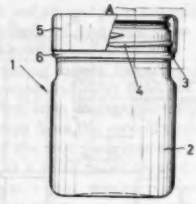
Dieter Fuchs, 19 Westring, Dissen T. W., Germany 4503

Filed June 2, 1975, Ser. No. 582,609

Claims priority, application Germany, June 7, 1974, 2427478

Int. Cl.² A47G *19/24*

U.S. Cl. 222—555 7 Claims



1. A caster for pulverulent, granular or lumpy substances such as spices, the caster comprising in combination:

a hollow body defining a storage chamber and at an outlet end thereof having a generally cylindrical wall portion defining a

cavity of circular cross-sections;

recess means provided in said generally cylindrical wall portion to at least partially encompass said cavity;

a cap insert made of synthetic material and comprising a resilient portion latchably engaging said recess means to retain said cap insert on said body, a hollow cylindrical portion of said cap insert having an external diameter slightly smaller than the diameter of said cylindrical portion so that a clearance is present between them and being received in said cavity, and a perforate plate portion extending at said outlet across the interior of said hollow cylindrical portion and being perforate in at least one of a plurality of spaced regions thereof;

a cover slide carried by said cap insert and rotatably mounted in the interior of said hollow cylindrical portion thereof, said cover slide comprising a plate portion having an aperture therein and slidably contacting said perforate plate portion of said cap insert, and a collar portion having wall members each extending substantially perpendicularly of said apertured plate portion to define therebetween a passage communicating with said aperture in said apertured plate portion; and

a lid member adapted to be detachably mounted to said generally cylindrical wall portion of said hollow body to extend across said cavity and having an internal surface which, when said lid member is mounted on said body, is adapted to contact both said cap insert and end faces of said wall members remote from said apertured plate portion.

4,003,507

NIGHT FIGHTER HOLSTER

Richard F. Elton, 2908 Roanoke Ave., Kettering, Ohio 45419

Filed Nov. 24, 1975, Ser. No. 634,650

Int. Cl.² F41C *33/04*

U.S. Cl. 224—2 B 7 Claims

1. A holster for activating light-activatable luminous material on the rear surfaces of the front and rear sights of a gun while it is holstered therein without revealing the position of the wearer during said activation comprising:

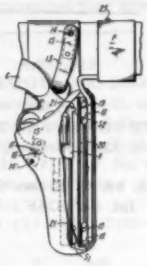
a receptacle well portion to house said gun, said well having a portion suitable for securing to a wearer's belt or harness;

a gun-restraining strap, one portion of which is secured to said well and another portion of which is fastenable to the outer surface of said well.

at least one light source positioned within the interior of said well for activating said luminous material;

a portable electrical power source operatively connected to said light source to provide the power for illuminating said light source;

an activator switch on the exterior surface of said holster well and;



means connecting said activator switch to both said electrical power source and said light source, whereby upon fastening said holster strap to said holster well said switch is off and said light source is out and upon unfastening said strap from said well said switch activates said light turning it on and causing it to illuminate thereby causing activation of said luminous material within the confines of the interior of said holster well to an extent sufficient to permit illumination thereof in total darkness.

4,003,508

CYCLE PACK

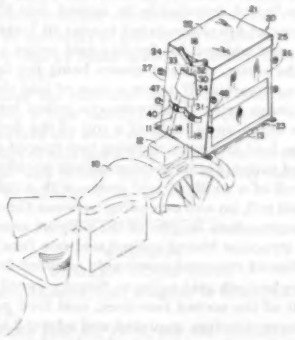
Karl S. Hoops, Box 305 Rte. 6, Idaho Falls, Idaho 83401

Continuation of Ser. No. 410,204, Oct. 26, 1973, abandoned.

This application Aug. 13, 1975, Ser. No. 604,087

Int. Cl.² B62J *7/04*

U.S. Cl. 224—32 R 1 Claim



1. A convertible pack for use as a back pack and on a cycle with an inverted V-shaped sissy bar having a pair of inclined arms which may be readily connected to and removed from said sissy bar comprising:

an enclosed container having a top, a bottom, a front wall, a rear wall and two side walls; and

a resilient, inverted V-shaped sleeve, open at its top and bottom, the edges of said sleeve being inclined at the same angle as the arms of said sissy bar, and spaced apart a distance such that said sleeve is stretched as it slides downwardly over said sissy bar, and carried by said front

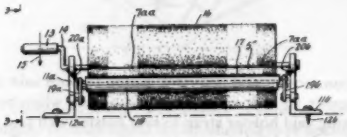
wall for sliding downwardly over said sissy bar a distance proportional to the loaded weight of said pack and for resiliently gripping the inclined arms of said sissy bar with a force proportional to the loaded weight of said pack, thereby simultaneously supporting the weight of said pack and stabilizing said pack to reduce lateral sway thereof.

4,003,509

DISPOSABLE BATH TOWEL AND DISPENSING DEVICE

George L. Camarero, 3304 93rd St., Jackson Heights, N.Y. 11372

Filed July 10, 1975, Ser. No. 594,949
Int. Cl.² B26F 3/02
U.S. Cl. 225—23 1 Claim



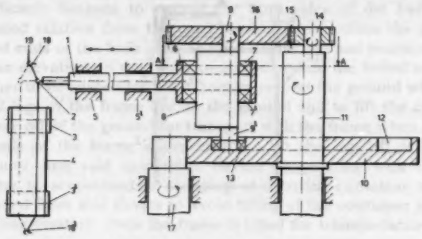
1. A disposable bath towel combination comprising in combination: a sheet of fibrous paper of a predetermined elongated length characterized by a predetermined high degree of absorbency for water, having imprinted thereon at least one face thereof bath towel-simulated border edging extending transversely along an axis of a width thereof at at-least each of two opposite ends of the elongated length of the sheet, adapted thereby as a bath or beach towel of a disposable nature, the absorbent fibers being substantially felted to said face, said face having imprinted thereon a predetermined bath towel multicolored zone extending axially in parallel along said elongated length adapted such that appearance thereof corresponds to a fabric cloth material bath towel of conventional cloth nature, and a series of said sheet in end-to-end relationship linked detachably by scored tear-lines between adjacent ones of towel-simulated border of serially consecutive sheets, and adapted for feeding said series a feed means mounting the series, the feed means being for facilitating an advancing and tearing-off one at a time of said sheet from the series, the series being lengthwise-axis rolled into a roll, the feed means being un-rollable of a roll of the series mounted thereon, the feed means comprising two spaced-apart pivotably mounted support arms substantially in parallel at opposite ends of a roll of a width of said series, with a roller mounted adjacent said roll, on and extending between the support arms at points intermediate lengths of the support arms, and with a knife-edge structure biased against said one face; and the roll being positioned mounted revolvably adapted for a cranking of the series beneath said roller to thereby unroll the series to a tear-point of the scored tear-lines, said feed means further including lever structure mounted and adapted to revolve the roll beneath the roller and the knife-edge structure, the roller and the knife-edge structure being in substantially parallel and side-by-side relationship to one-another such that the sheet next-occuring to be next torn-away is held flushly against lower layers therebeneath sheets of the roll when the knife-edge structure is biased against the scored tear-lines of a hanging terminal sheet ready to be torn from the roll, and the feed means further including spring structure mounted and adapted to pivotably bias the support arms and the roller and the knife-edge structure inwardly toward the roll, and said lever structure including a crank mounted and adapted for revolving said roll.

4,003,510

PROCESS AND APPARATUS FOR EXTENDING THE LIFE OF THE BELT OF A DELIVERY DEVICE FOR TEXTILE FILAMENTS

Albert Rebsamen, Wilen, and Franz Xaver Scherrer, Lichtensteig, both of Switzerland, assignors to Heberlein & Co. AG, Wattwil, Switzerland

Filed July 24, 1975, Ser. No. 598,817
Claims priority, application Switzerland, Aug. 28, 1974, 11703/74
Int. Cl.² B65H 51/14, 54/32
U.S. Cl. 226—1 7 Claims



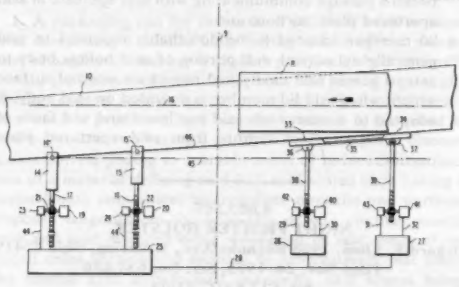
7. A process for extending the life duration of a circulating delivery belt having a surface for receiving thereon a stream of textile filaments and carrying said filaments longitudinally of said belt, said process comprising imparting to said stream immediately, prior to reaching said belt, to-and- fro transverse movements having a basic uniform component of reciprocation and an additional uniform component of reciprocation superposed on said basic component so that the points of reversal of said to-and-fro movement are distributed across said belt, the number of said points of reversal being greater than would be available from either of said components alone, said process further comprising imparting to said belt a period of circulation which is different from the period of said basic component of reciprocation.

4,003,511

METHOD AND APPARATUS FOR ALIGNING STRIP END PORTIONS IN A CONTINUOUS STRIP OPERATION

Crayton H. Schwestka, Michigan City, Ind., assignor to National Steel Corporation, Pittsburgh, Pa.

Filed Apr. 15, 1976, Ser. No. 677,170
Int. Cl.² B65H 25/26
U.S. Cl. 226—3 8 Claims



5. In continuous strip handling utilizing apparatus having a longitudinal center line in the direction of strip movement through the apparatus where a longitudinal portion of the trailing end portion of a first strip is aligned with a longitudinal portion of the leading end portion of a second strip prior to the step of welding the strip end portions together, the method comprising

sensing the position of one side edge of the first strip trailing end portion at a first point along the length of the first strip,

sensing the position of the one side edge of the first strip trailing end portion at a second point along the length of the first strip spaced from the first point in the direction of movement of the strip through the equipment,

generating a signal indicative of the distance between the second point and said center line and of the angle, if any, a first vertical reference plane passing through the second point and the first point makes with a second vertical reference plane parallel to the longitudinal center line of the apparatus and passing through the second point,

providing first and second strip engaging elements disposed along the length of one side edge of the second strip leading end portion,

providing actuating means for moving the strip engaging elements toward and away from the second strip,

moving the first strip engaging element actuating means toward or away from the second strip along a first path an extension of the first path intersecting the second reference plane at a third point located in the second reference plane at a first predetermined distance from the second point in the direction opposite to movement of the strip through the equipment,

moving the second strip engaging element actuating means toward or away from the second strip along a second path, an extension of the second path intersecting the second reference plane at a fourth point located in the second reference plane at a predetermined distance greater than the first predetermined distance from the second point in the direction opposite to movement of the strip through the equipment, and

utilizing the generated signal for controlling movement of the strip engaging element actuating means to dispose the strip engaging elements in the first reference plane, or in a plane parallel to the first reference plane if the width of the second strip is different from that of the first strip, whereby the second strip leading end portion one side edge can be brought into registry with the strip engaging elements of the strip positioning member for aligning the longitudinal center line of the second strip leading end portion with the longitudinal center line of the first strip trailing end portion.

4,003,512

APPARATUS FOR SEQUENTIALLY AND SIMULTANEOUSLY DRIVING PLURAL PAIRS OF FEED ROLLERS

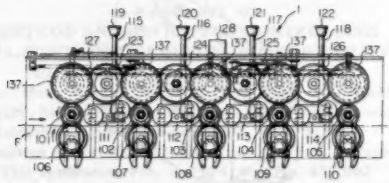
Ikuji Mori, 26-6, Unoki 3-chome, Ota, Tokyo, Japan

Filed Sept. 11, 1974, Ser. No. 505,099

Claims priority, application Japan, Sept. 29, 1973, 48-109532

Int. Cl.² B65H 17/22

U.S. Cl. 226—188 3 Claims



1. A draped film loop forming device for use in automatic elongated film developing apparatus, comprising: a plurality of paired film feed rollers located along a predetermined film passage; a roller gear mounted on one of said paired rollers; one film feed roller driving gear provided for each of said roller gears for engagement therewith; one set of transmission gears provided for each of said feed roller driving gears for engagement therewith; one clutch means provided for each set of said feed roller driving gear and transmission gear for connecting the same integrally with each other; driving means for driving said transmission gears; and a clutch operating mechanism for controlling and switching the mode of operation of said plurality of paired film feed rollers between a simultaneous drive mode where all of said plurality of paired film feed rollers are rotated simultaneously at a uniform speed and a sequential drive mode where each pair of said plurality of paired film feed rollers are rotated sequentially from the preceding pair at predetermined time intervals.

4,003,513

EXPLOSIVE WELDING

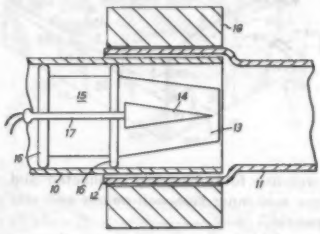
Michael Dickenson Chadwick, Newcastle-upon-Tyne, England, assignor to International Research & Development Company Limited, Newcastle-upon-Tyne, England

Filed Aug. 25, 1975, Ser. No. 607,670

Claims priority, application United Kingdom, Aug. 28, 1974, 37642/74

Int. Cl.² B23K 19/00

U.S. Cl. 228—107 10 Claims



1. A method of explosively welding a metal pipe to a metal member having a bore to receive said pipe comprising the steps of

i. disposing said pipe in said bore with a clearance between the outer surface of the said pipe and the wall of said bore,

ii. locating within said pipe an impactor comprising a body of impacting medium containing an explosive charge, the surface of said body at least in the region surrounding the explosive charge being spaced from the inner surface of the pipe, and

iii. detonating the explosive charge and thereby

iv. imparting a high velocity to the impacting medium before it strikes the inner surface of the pipe,

v. the impact of said impacting medium on the pipe accelerating the wall of the pipe to a velocity such that it is welded to the wall of the said bore.

4,003,514

FROZEN FOOD TRAY

Earl J. Graser, Monroe, La., assignor to Olinkraft, Inc., West Monroe, La.

Filed Jan. 21, 1976, Ser. No. 651,093

Int. Cl.² B65D 5/22

U.S. Cl. 229—34 HW 1 Claim

1. A tray for storing and reheating food comprising

a centrally located base portion having a pair of sides and a pair of ends;

opposing inner and outer side-wall panels;

said side-wall panels connected therebetween by a rim portion to form spaced apart hollow side walls formed on each side of said base portion

said inner side-wall panels being hingedly connected and perpendicular to said base portion;

said inner side-wall panels having hingedly connected

thereto said rim portion which lies parallel to said base portion;

said rim portion having hingedly connected thereto said outer side-wall panels on the side opposite said inner side-wall panels;

said outer side-wall panels having hingedly connected on the outer edge thereof an elongate flap;

said elongate flap being adhesively secured to the underside of said base portion;

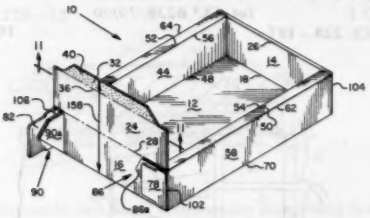
opposing inner and outer end-wall panels formed on each end of said base portion;

said inner end-wall panels being hingedly connected and perpendicular to said base portion;

said outer end-wall panels being hingedly connected to said inner end-wall panels;

said outer end-wall panels having hingedly connected on the outer edge thereof a narrow flap;

said narrow flap being adhesively secured to the underside of said base portion;



corner web-like folds hingedly connected and positioned between said inner side-wall panels and said inner end-wall panels;

said corner folds having a scoreline in the central portion thereof for folding the interior surfaces of the corner folds against each other;

securing flaps formed on said outer side-wall panels;

said securing flaps being folded over and disaposed adjacent said corner folds;

interior and exterior portions of said tray being formed from foil laminated paperboard;

a separate one-piece lid being adhesively secured to the package;

said lid having a generally triangular-shaped, reverse cut tear-out portion, and

said tear-out portion having a partially glued protuberance at one end thereof.

4,003,515

HANDLE CONTAINER

Artie Steele, Hampton, Ga., assignor to Union Camp Corporation, Wayne, N.J.

Filed Jan. 5, 1976, Ser. No. 646,485

Int. Cl.[2] B65D *5/02, 5/46*

U.S. Cl. 229—52 B **4 Claims**

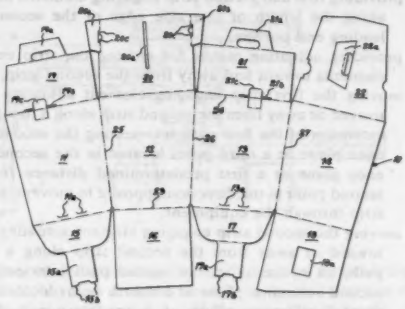
1. A four-sided handle container having a bottom and a top closure, said top closure comprising:

a closure flap secured to each side along a hinge line so that the four said flaps can be folded into overlapping horizontal positions to close the container;

the opposite first and second said flaps having first and second handle members secured respectively to such flaps along first and second parallel hinge lines, the said parallel hinge lines and first and second handle members being positioned so that the handle members can be folded normal to the closed flaps into superimposed relationship;

the third said flap having a third handle member secured to such flap along a third hinge line normal to the said first and second parallel hinge lines of the first and second flaps, said third flap having a first slot adjacent the third hinge line, said third hinge line, first slot and third handle member being positioned so that the third flap can be folded into superimposed relationship over the first and second flaps, the superimposed first and second handle members can be inserted through the said first slot, and the third handle member can be folded normal to the first, second and third flaps with the first, second and third handle members in superimposed relationship;

the fourth said flap having a second slot parallel to the first slot, said second slot being positioned so that the fourth flap can be folded into superimposed relationship over



the third flap and the first, second and third superimposed handle members can be inserted through the second slot;

means for securing the said flaps in closed position comprising:

a tab secured to each outer corner of the fourth said flap along a tab hinge line parallel to the said second slot; and

tab slots cut out of the first and second said flaps along the hinge lines securing such flaps to the sides, said slots being of a size to receive the said tabs;

the said tabs and tab slots being positioned so that, when the flaps are folded into closed position, the said tabs can be inserted into the said tab slots to lock the flaps into closed position.

4,003,516

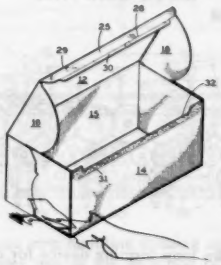
ICE CREAM CARTON

H. Fred Commerford, Orinda; Arthur C. Dreshfield, Lafayette, both of Calif., and Thomas J. Sellors, Waukegan, Ill., assignors to Potlatch Corporation, San Francisco, Calif.

Filed July 9, 1975, Ser. No. 594,328

Int. Cl.[2] B65D *5/54*

U.S. Cl. 229—51 SC **5 Claims**



1. A half-gallon carton comprising, in combination,

top and bottom panels having a length to width ratio of approximately two to one, or more,

front and rear panels having a length to height ratio of at least two to one,

front opening and reclosure means comprising less than 10 percent of the perimeter dimension of said carton taken around its width and height,

opposed closure flaps at each end which together substantially cover the end of the tubular interior defined by the top, bottom, front and rear panels,

the whole defining a carton having a perimeter dimension taken around its width and height of less than about 15.7 inches, and produced from a blank which is less than about 15.7 inches long at any point across its width.

4,003,517

ELASTICALLY YIELDABLE RAIL FASTENER

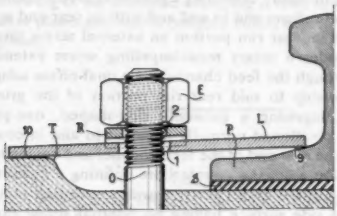
Michel Duchemin, Lambres-les-Douai, France, assignor to Ressorts du Nord S.A., Paris, France

Filed Apr. 14, 1975, Ser. No. 567,530

Claims priority, application France, Apr. 19, 1974, 74.13725; Apr. 19, 1974, 74.13726

Int. Cl.² E01B *9/30*

U.S. Cl. 238—349 **10 Claims**



1. An elastically yieldable fastener structure for a railway rail comprising at least one main bending strip defining an aperture for the passage of clamping means for the fastener structure and extending in a first general direction and having lateral edges extending substantially in said first direction, an elastically yieldable means which extends in a second general direction substantially perpendicular to said first direction and is curved in said second direction and has a concavity directed toward the main strip and has two end portions which are respectively in bearing relation to said edges of the main strip so that when a clamping force is exerted on the yieldable means by said clamping means the yieldable means transmits said clamping force to the strip in the region of said end portions and relieves the strip of said clamping force in the region of said aperture.

4,003,518

METHOD AND DEVICE FOR CONTROLLING COMBUSTION IN LIQUID FUEL BURNER UTILIZING ULTRASONIC WAVE TRANSDUCER

Makoto Hori, Nara; Nerumitu Rokudo, and Toshiyuki Ishiguro, both of Yamato-Koriyama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

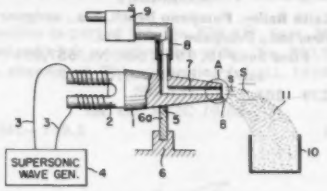
Continuation of Ser. No. 283,200, Aug. 23, 1972, abandoned. This application Feb. 4, 1974, Ser. No. 439,002

Claims priority, application Japan, Aug. 25, 1971, 46-65323; Apr. 25, 1972, 47-41982

Int. Cl.² B05B *3/14, 17/06*

U.S. Cl. 239—4 **3 Claims**

1. A method for controlling the combustion in a liquid fuel burner of the type utilizing a liquid fuel atomizer comprising a hollow horn which is oscillated at an ultrasonic frequency and includes a nozzle, said method comprising the step of supplying kerosene to a nozzle having a ratio of the area of the end surface of said nozzle to the area of the nozzle opening of 4.5



to 9, thereby controlling the liquid fuel atomization conditions.

4,003,519

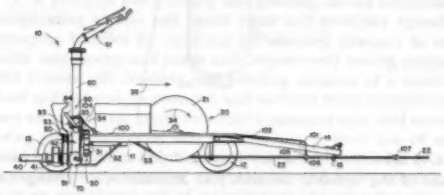
TRAVELING IRRIGATION SPRINKLER

Frederick V. Kruse, Kilbourne, and Deane O. Behrends, Havana, both of Ill., assignors to AG-Rain Incorporated, Havana, Ill.

Filed Apr. 8, 1976, Ser. No. 675,169

Int. Cl.² B05B *3/18*

U.S. Cl. 239—183 **12 Claims**



1. An irrigation apparatus, comprising:

a. a frame supported on wheels with selected ones of the wheels being steerable to guide the movement of the apparatus;

b. a winch carried on the frame and including a rotatably mounted cable drum and a cable, the cable having one portion secured to the drum and another portion extensible forwardly of the apparatus to define a path of travel to be followed by the apparatus;

c. steering means carried on the frame for steering the apparatus along a path defined by a forwardly extending portion of the cable;

d. water inlet means adapted for connection to a source of pressurized irrigation water;

e. water sprinkler means for distributing irrigation water in a predetermined manner about the apparatus;

f. a water powered radial inflow turbine including housing structure having inlet and outlet portions, a drive shaft journaled by the housing structure, and a vaned runner carried on the drive shaft for rotation therewith, the drive shaft being drivingly connected to the cable drum to rotate the cable drum and reel in the forwardly extending cable portion in response to a supply of pressurized water to the turbine;

g. flow control means communicating the inlet means, the sprinkler means and the turbine, and including a member which is movable to control the proportion of pressurized water which is supplied directly to the sprinkler means and which passes through the turbine before being supplied to the sprinkler means;

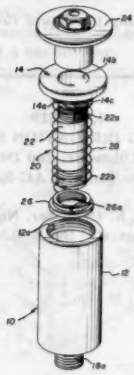
h. the housing inlet portion defining an inlet scroll for admitting water at substantially uniform velocity to the periphery of the vaned runner, the inlet scroll having an inlet chamber which diminishes in cross-section as it extends circumferentially around the vaned runner.

4,003,520

LAWN SPRINKLER WITH REPLACEABLE SPRINKLER ASSEMBLY

Gordon Keith Bailey, Pompano Beach, Fla., assignor to Plastic Industries, Inc., Pompano Beach, Fla.

Filed June 18, 1975, Ser. No. 587,959
Int. Cl.² B05B 15/10, 1/00
U.S. Cl. 239—205 4 Claims



1. A lawn sprinkler which may be disassembled for replacement of the sprinkler assembly to accommodate changes in surrounding soil or grass level, comprising:

a sprinkler body having a substantially cylindrical shape, the upper end thereof being opened, an inlet at the bottom end thereof for receiving water into said sprinkler body from an underground supply of water under pressure, and a closure member removably connected to the upper end of said sprinkler body and including a central passageway,

a sprinkler assembly mounted for movement relative to said sprinkler body between a retracted position and an extended position including a longitudinally extending pipe for the passage of water therethrough, said pipe being arranged to slidably extend through said central passageway so that the upper end is outside of said sprinkler body, a sprinkler head removably connected to the upper end of said pipe, a base member connected to the lower end of said pipe and responsive to water received under pressure through said inlet to actuate said sprinkler assembly from said retracted position to said extended position, whereby water is forced through said pipe and is dispersed by said sprinkler head,

a coil spring mounted on said pipe and operatively connected thereto to be compressed when said sprinkler assembly is actuated to said extended position, and to be expanded for urging said sprinkler assembly from said extended position to said retracted position upon the discontinuation of water pressure, and

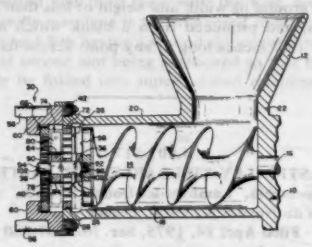
said sprinkler assembly and coil spring being so constructed that they are slidably removable as a unit and in a single operation from the upper end of said sprinkler body for replacement thereof with different length pipes to accommodate changes in surrounding soil or grass level requiring only the removal of said closure member from the upper end of said sprinkler body which is accomplished manually and without any tools while said sprinkler body remains connected to said underground water supply.

4,003,521

DUAL-PHASE MEAT GRINDER ADAPTER

Charles W. Hess, Schiller Park, Ill., assignor to Speco, Inc., Schiller Park, Ill.

Filed May 27, 1975, Ser. No. 581,275
Int. Cl.² B02C 18/30
U.S. Cl. 241—82.4 3 Claims



1. The combination with a meat grinder of the type which includes an elongated generally cylindrical grinder casing defining therein for the rearward passage of meat pieces to be ground a longitudinally extending cylindrical feed channel of uniform diameter from end to end and with its rear end open, and having on its rear rim portion an external screw thread, and also includes a rotary meat-impelling worm extending lengthwise through the feed channel, of a dual-phase adapter secured removably to said rear rim portion of the grinder casing and comprising a generally ring-shaped, one-piece adapter body positioned normally adjacent to and in coaxial relation with the rear end of the feed channel and having in its front end region a coaxial counterbore defining a cylindrical internal side surface and a flat inwardly extending annular shoulder, said side surface having an internal screw thread normally threadedly received over said external screw thread on the rear rim portion of the grinder casing, and said flat inwardly extending annular shoulder normally being in direct contact with the end face of said rear rim portion of the grinder casing, said ring-shaped, one-piece adapter body having on its rear end region an internal, flange-like, inturned seating rim the inner surface of which is flat and annular and is at all times spaced a fixed distance from said annular shoulder due to the one-piece character of the adapter body, a pilot shaft normally positioned in coaxial relation at the rear end region of the grinder casing, having its front end connected fixedly to the rear end of the worm, and comprising a non-circular cutter-impelling inner section and a reduced cylindrical outer pilot section, a fixed primary perforated breaker plate fitting slidably within and extending across said rear rim region of the grinder casing and embodying in its central portion a circular hole through which the cutter-impelling inner section of the pilot shaft extends loosely and rotatably, a fixed secondary perforated breaker plate fitting slidably within and extending across the central region of the adapter body, spaced rearwards from the primary breaker plate, having its peripheral portion seated directly against the inner surface of said inturned seating flange, and having in the central portion thereof a circular pilot hole in which said outer pilot section of the pilot shaft is journalled, a primary cutter assembly positioned within said rear rim region of the grinder casing, fitting directly against the front surface of the primary breaker plate, and having in the central portion thereof a non-circular opening through which the cutter-impelling section of the pilot shaft extends driveably, a dual edge secondary cutter assembly interposed between the two breaker plates and having a central non-circular opening through which said cutter-impelling inner section of the pilot shaft extends driveably, said secondary cutter assembly having a front knife edge in direct shearing contact with the rear face of the primary breaker plate and a rear knife edge in direct shearing relation with the front face of the secondary breaker plate and serving when in its operative position to maintain the two breaker plates at all times in

fixed spaced apart relation, said front end region of the body being provided with a series of circumferentially spaced notch-like recesses which interrupt said internal screw thread and have open outer and inner sides, clamping inserts slidably mounted in said recesses and having internal screw thread segments which, in effect, constitute continuations of said internal screw thread in the front end region of the body, reaction plates secured fixedly to the outer periphery of the adapter body, projecting across the outer sides of said notch-like recesses, and having internally threaded holes extending through their central portions, and clamping screws extending through and threadedly received in said internally threaded holes in said reaction members, having their inner ends in abutment with the outer portions of the clamping inserts, and adapted when tightened to force said clamping inserts radially inwardly within the body in order slightly laterally to misalign their internal screw thread segments and the interrupted internal screw thread on the body and thus increase the mating pressure between said internal screw thread segments and the internal interrupted screw thread to such an extent as to cause the body to be firmly secured against rotation relatively to the grinder casing, said ring-shaped, one-piece adapter body having but the one aforementioned screw thread and being adapted when removed as a unit from the rear rim region of the grinder casing by a single unscrewing action after prior unscrewing of the aforesaid clamping screws to expose the two breaker plates and said secondary cutter assembly for removal purposes.

4,003,522

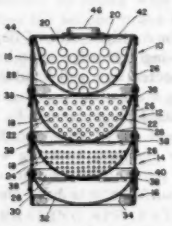
COLANDER SYSTEM FOR BAKERY PRODUCTS USE

Betty J. Buckley, 662 Linden Ave., York, Pa. 17404

Filed Dec. 12, 1975, Ser. No. 640,014

Int. Cl.² B02C *19/08*

U.S. Cl. 241—95 **6 Claims**



1. A colander system for converting stale bakery products and the like into useful comminuted products, said system comprising in combination a series of colanders of similar diameter and having open tops and concave bottoms having a plurality of openings in at least the normally lower part of each concave bottom, said openings in the different colanders respectively being of different sizes, said colanders having means operable to effect stacking the same one above the other when in use and the colander having the largest openings being uppermost and successive lower colanders each having smaller openings than the one above, a receptacle for comminuted products positioned beneath the lowermost colander in use, and a pestle operable to engage pieces of bakery products in the uppermost colander and comminute said products for passage through the openings in said uppermost colander and successively through the openings in the lower colanders and thereby selectively classify the products as to size or to permit engagement thereof by said pestle as desired when upper colanders are removed to expose the lower colanders.

4,003,523

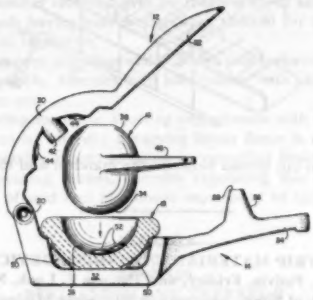
PORTABLE PILL GRINDER

Harry S. Doolittle, 19 Concord Lane, Wallingford, Conn. 06492

Continuation-in-part of Ser. No. 509,421, Sept. 26, 1974, abandoned, which is a continuation of Ser. No. 353,939, April 24, 1973, abandoned. This application July 23, 1975, Ser. No. 598,431

Int. Cl.² B02C *19/08*

U.S. Cl. 241—169.2 **17 Claims**



1. A portable pill crushing and grinding device comprising cooperating mortar and pestle units and manually operable clamping handles for applying pill crushing pressure to said units, said mortar and pestle units respectively having concave and convex pill crushing and grinding surfaces of a smooth, hard and impervious material, said surfaces being complementary and relatively rotatable about a common axis, said mortar being removable from said handles and at least one of said units having a manually engageable rotating handle for effecting such relative rotation, and said one unit being connected with an associated one of said clamping handles for relative rotation whereby said clamping and rotating handles may be grasped respectively in one and opposite hands and simultaneously squeezed together and swung back and forth respectively to apply crushing and grinding pressures on one or more pills disposed between said complementary mortar and pestle surfaces.

4,003,524

CROSS-WINDING MACHINE

James Dove Wilford Taylor, Gorebrook Works, Pink Bank Lane, Longsight, Manchester, and Stephen Temple, Bar Hill, Cambridge, both of England

Filed Nov. 29, 1974, Ser. No. 528,100

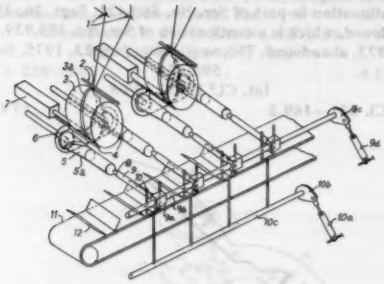
Claims priority, application United Kingdom, Dec. 4, 1973, 56190/73

Int. Cl.² B65H *54/02*, *54/06*

U.S. Cl. 242—18 R **25 Claims**

1. A cross-winding machine, comprising a winding mandrel, means for continuously rotating the mandrel whilst cross-wound packages are successively formed thereon, a package support extending in alignment with the mandrel to receive wound packages therefrom, package doffing means having a package doffing member and reciprocable means for moving said member, upon completion of winding on the mandrel of a first wound package, alongside the mandrel first from a retracted position remote from the package support to a position in which rotation of said first wound package at mandrel speed is maintained until a predetermined part of the winding of a second package has been effected on the mandrel and

then to a position in which said first wound package is transferred to the package support, and, thread severing means



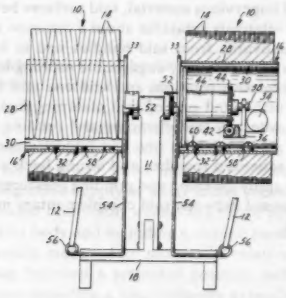
operable to cut thread between the mandrel and the package support.

4,003,525

STRIP MATERIAL UNWINDING DEVICE

Richard T. Podvin, Fridley, and Thomas F. Look, New Brighton, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed July 14, 1975, Ser. No. 595,397
Int. Cl.² B65H *17/02, 23/20, 75/02*
U.S. Cl. 242—55 **5 Claims**



1. A device adapted for supporting a high inertia spool of stretchable strip material being withdrawn at varying rates by a strip applicating machine said spool comprising a core having a central opening and a peripheral surface around which said strip material is wound, said device comprising:

a frame;

a hub mounted on said frame for rotation about an axis, said hub being adapted for coaxially receiving a said core with at least a portion of said hub in the central opening of said core;

means on said peripheral surface for releasably engaging the core of a said spool positioned on said hub to cause rotation of the spool with said hub, said means comprising a plurality of circumferentially and axially spaced radially projecting button-like projections, each of said projections comprising a resilient washer of frictional material and an attaching screw positioned generally centrally of said resilient washer adjusted to centrally compress said washer, the peripheral surface defined by said washers being adapted to frictionally receive the inner surface of a said core;

a variable speed motor mounted on said frame;

means for providing driving engagement between said motor and said hub;

power adjustment means adapted to be energized by an external conventional source of power and electrically coupled to said motor for adjusting the power supplied to said motor at power settings between no power and full power to vary the speed of rotation of said hub; and

tension sensing means adapted for sensing the tension in a said length of strip material between a said roll of strip material and a said applicating machine and coupled to said power adjustment means for activating said power adjustment means in direct proportion to the tension in the strip material;

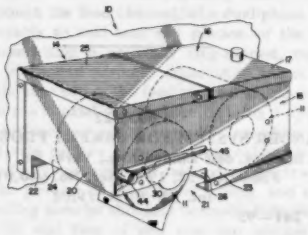
said means for providing driving engagement between said motor and said hub comprising means for braking inertial rotation of said hub upon a decrease in the amount of power supplied to said motor by said power adjustment means.

4,003,526

DISPENSER FOR ROLLS OF FLEXIBLE SHEET MATERIAL

Clarence H. Fishburn, 1642 Woodcrest Drive, Wooster, Ohio 44691

Filed Nov. 24, 1975, Ser. No. 634,639
Int. Cl.² A47K *10/22*
U.S. Cl. 242—55.3 **4 Claims**



1. A dispenser for multiple rolls of flexible sheet material with a housing having a storage chamber and a dispensing chamber interconnected by a roll handling mechanism:

said roll handling mechanism comprising opposed projecting and retractable lugs carried by and slidable within dual longitudinal tracks and including dual upper and lower actuator elements coacting with detent elements and dual drive pins confined within angular slots defining inclined cam surfaces in a base element carrying each said lug;

each said upper actuator element being an elongated component with a medial portion having a transverse notch to captivate a lug base element and permit a "lost motion" projection and retraction movement of a lug, there being above each transverse notch dual elongate slots for receiving and guiding said dual drive pins, the length of said slots being such as to permit a "relative motion" of said upper and lower actuator elements, said upper actuator elements being coupled together for unitary movement by a cross bar, said cross bar carrying an actuating knob;

each said lower actuator element being an elongated component with a medial portion having a transverse notch to receive a lug base element and having a length such as to permit a "relative motion" of a lug during movement of said upper and lower actuator elements, each notch carrying said dual drive pins, said lower actuator elements being coupled together for unitary movement by a cross bar;

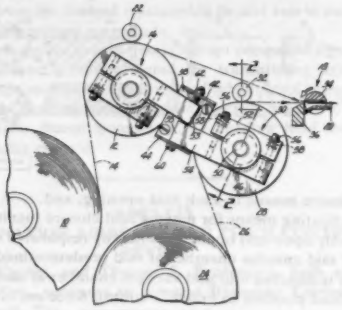
said detent elements being carried by a lower actuator element and projecting through an elongate slot in an upper actuator element to engage with detent holes in a longitudinal track.

4,003,527

CONTROL MEANS FOR ROLL SHEET FEEDER

John Jacob Schulze, Prospect Heights, Ill., assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Oct. 1, 1975, Ser. No. 619,145
Int. Cl.² B65H *19/08, 19/20, 17/42*
U.S. Cl. 242—58 **5 Claims**



1. In combination with an apparatus for selectively feeding a web from either one of a pair of web rolls to a work station, a control means for partially withdrawing from the work station the web last fed thereto, comprising:

a first and second rotatable member each associated with one of the webs, said members adapted to be selectively driven in a forward direction for advancing a web to the work station and a reverse direction for withdrawing a web from the work station;

a first and a second brake means mounted on the first and the second members respectively, and conditionable between a driving position for rotation with the members and a release position for non-rotation relative to the members;

said first brake means co-acting with the second brake means for rotating the second brake means and the second member in the reverse direction in response to the first member being driven in the forward direction; and

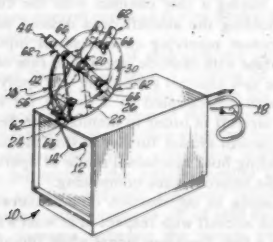
stop means for conditioning the first brake means to the release position in response to the second member being rotated through a predetermined angular distance and the second brake means being arrested by the stop means.

4,003,528

MOUNTING AND BRAKING APPARATUS FOR COILED WELDING WIRE

Joe L. Booze, 185 E. Benwood St., Covina, Calif. 91722

Filed Dec. 31, 1975, Ser. No. 645,821
Int. Cl.² B65H *17/52*
U.S. Cl. 242—106 **6 Claims**



1. In combination with a mounting and braking apparatus of the type wherein a coil of welding wire is mounted on a rotating reel, and wherein the wire is fed therefrom at a controlled rate of speed into an electric welding machine for operation therewith, the improvement which comprises:

a mounting bracket for attachment to said welding machine, having a base member and an integrally formed upright leg member provided with an opening therein;

a spindle disposed within said leg member and received through said opening therein;

fastening means to secure said spindle to said leg member;

insulating means disposed between said leg member, said spindle, and said fastening means;

a hub member received over for rotation about said spindle, said hub having said reel secured thereto for controlled rotation therewith;

bearing means interdisposed between said hub member and said spindle, whereby said hub rotates with said bearing means; and

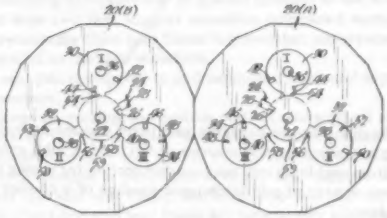
an adjusting means in abutting engagement with said bearing means, whereby a varying linear force is applied to said bearing means to cause a controlled binding within said bearing means, thereby regulating the rotational speed of said reel and linear movement of said welding wire.

4,003,529

REEL AND BLANK THEREFOR

Paul R. Nigro, Chicago, Ill., assignor to Royal Continental Box Company, Cicero, Ill.

Filed Apr. 4, 1975, Ser. No. 565,218
Int. Cl.² B65H *75/14*
U.S. Cl. 242—118.8 **33 Claims**



1. A reel of the type having a generally cylindrical core and a head at each end thereof and assembled from a pair of generally planar blanks:

said blanks defining said reel heads; and

a core disposed between said heads along the axis of said reel;

said core formed by at least one core member at least partially severed from one of said blanks at a location radially offset from the axis thereof and displaced from its offset location to its axial core forming position.

4,003,530

PNEUMATIC COURIER DISCHARGE UNIT

Orin H. Davis, 6620 N. 16th Drive, Phoenix, Ariz. 85015

Filed Aug. 13, 1975, Ser. No. 604,302
Int. Cl.² B65G *51/30*
U.S. Cl. 243—20 **5 Claims**

1. In a pneumatic courier system, a courier discharge unit for receiving couriers from a courier conveying conduit within the system and directing the couriers into a shoe, said courier discharge unit comprising:

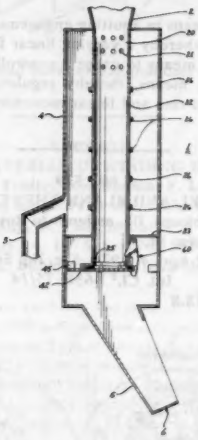
a. a housing having an input conduit and an outlet for accommodating passage of couriers therethrough;

b. a conduit section disposed within said housing and interconnecting said input conduit and said courier outlet for transporting the couriers from said input conduit to said courier outlet;

c. a pivotable plate latchable to a first position for sealing said courier outlet to define a closed end cavity within said conduit section and operable to a second position to permit discharge of couriers through said courier outlet into the shoe, said plate including a counterweight for biasing said plate to said first position;

d. a necked length of said input conduit to reduce the diameter thereof, said conduit section being of a diameter equivalent to the reduced diameter of said input conduit, for restricting air blowby intermediate the courier and the wall of said conduit section and establishing an air pressure buildup intermediate said plate and the approaching end of the courier;

e. latch means responsive to travel of a courier in proximity thereto for releasing said plate from said first position, said latch means comprising: a depending pivotable latch



having a lip for engaging said plate and maintaining said plate adjacent said courier outlet; and a lobe extending from said latch into said conduit section for urging pivotal movement of said latch upon passage of a courier therepast;

f. a plurality of apertures disposed within said conduit section for directing a flow of air from said input conduit into an envelope defined by said housing and said conduit section; and

g. an outlet conduit for exhausting the flow of air entering the envelope within said housing;

whereby, the momentum of a courier entering said courier discharge unit is retarded by an air pressure buildup within said conduit section prior to discharge of the courier through said courier outlet into the shoe while retaining the integrity of the flow of air through the pneumatic courier system.

4,003,531

REVERSE FLOW REACTION CONTROL SYSTEM

Robert H. Fink, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 6, 1975, Ser. No. 574,974

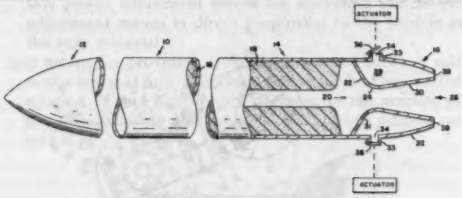
Int. Cl.² F42B *15/18*

U.S. Cl. 244—3.22 **1 Claim**

1. A directional control system for maintaining a missile on a launch predetermined path comprising:

a. a body having forward, intermediate, and aft sections, said intermediate section enclosing a propellant and said aft section enclosing a nozzle in communication with said propellant;

b. an annulus chamber carried in said aft section around said nozzle means for creating a vacuum in said chamber comprising an opening at the aft most end thereof, whereby the kinetic energy of the burning propellant exhaust gases pump a vacuum in said annulus chamber, said annulus chamber having openings at predetermined positions around the periphery thereof for communication of said chamber with the atmosphere;



c. closure means in each said opening; and,

d. activating means for moving said closure means to selectively open said openings, whereby responsive to opening of said annulus chamber at said predetermined positions air is directed into said vacuum chamber at said predetermined position to create a control force on said missile.

4,003,532

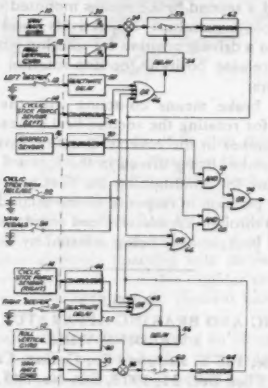
HEADING HOLD LOGIC

Don L. Adams, Sr., Fairfield, and Raymond G. Johnson, Jr., Milford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Mar. 15, 1976, Ser. No. 666,590

Int. Cl.² B64C *11/34*; G05D *1/08*

U.S. Cl. 244—17.13 **13 Claims**



1. In an aircraft automatic flight control system, the flight control system having a yaw channel with the capability of automatically holding the aircraft on a desired heading, the flight control system receiving aircraft status input information commensurate with attitude, speed and rate of change of heading and the yaw channel generating and applying control signals to an actuator coupled to a device for varying the heading of the aircraft in order to maintain the desired heading, the flight control system further having means for interrupting the heading hold functional mode of operation of the yaw channel, the improvement comprising:

means responsive to information commensurate with the status of the aircraft with respect to at least a first axis for generating a first deviation signal when the aircraft deviates from the desired relationship to the said axis;

means responsive to a manually produced input for generating a first enabling signal;

means responsive to information commensurate with the airspeed of the aircraft for generating a second enabling signal, said second enabling signal being indicative of the aircraft traveling at a forward speed in excess of a predetermined minimum;

means responsive to said first deviation signal and said first enabling signal for generating a first heading hold interrupt command signal indicative of deviation of the aircraft from the desired relationship to said axis in excess of a predetermined magnitude; and

means responsive to said first interrupt command signal and said second enabling signal for transmitting said first interrupt command signal to the flight control system yaw channel heading hold function interrupt means to cause automatic discontinuance of the heading hold mode of automatic control.

4,003,533

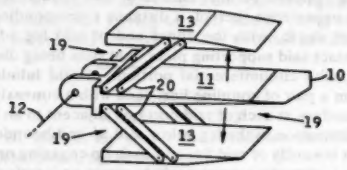
COMBINATION AIRBRAKE AND PITCH CONTROL DEVICE

Glenn T. Carter, and Thomas F. Paniszczyn, both of Fort Worth, Tex., assignors to General Dynamics Corporation, Fort Worth, Tex.

Division of Ser. No. 402,540, Oct. 1, 1973, Pat. No. 3,942,746, which is a continuation-in-part of Ser. No. 212,180, Dec. 27, 1971, abandoned. This application Feb. 5, 1976, Ser. No. 655,585

Int. Cl.² B64C *9/32*

U.S. Cl. 244—42 D **2 Claims**



1. A combination airbrake and pitch control device having both airbrakes and pitch and trim control surfaces for forming the trailing edge portion of an aircraft fuselage afterbody section and useable selectively to provide auxiliary pitch and trim control with minimal fuselage wake drag and buffeting or for airbraking or both which comprises:

an auxiliary elevator means having external control surfaces thereon and adapted to be pivotably attached to an airfoil-configured afterbody section of an aircraft fuselage so as to form a hinged trailing edge portion thereof aerodynamically and structurally continuous with said airfoil-configured afterbody section to provide auxiliary pitch and trim control for the aircraft;

a pair of upper and lower airbrake panels adapted to fit flat-like against the external control surfaces of said elevator means in close covering relation thereto when in retracted position and to be moved away from the elevator means control surfaces during deployment to airbraking position,

outer directed surfaces of said airbrake panels when fully retracted forming at least a portion of the upper and lower pitch and trim control surfaces for said pitch control device in continuation of the airfoil-configured fuselage afterbody at the trailing edge portion thereof;

linkage means operatively connected with said airbrake panels for moving the panels parallel to said external control surfaces between positions substantially against said surfaces and positions off of said surfaces to create airflow passages between the panels and the elevator means; and

said elevator means and airbrake panels operatively connected for pivotal movement together as a unit to provide effective auxiliary pitch control for an aircraft when the airbrake panels are against said control surfaces and when the panels are moved off of the control surfaces into the airstream at the trailing edge portion of said fuselage afterbody.

4,003,534

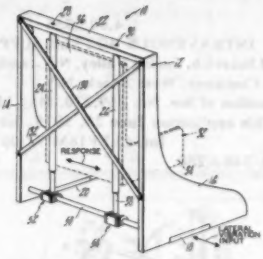
PILOT SEAT WITH LATERAL VIBRATION ISOLATION

Irwin J. Kenigsberg, Trumbull; William A. Girvan, Stratford, and Jerome T. L. Abbe, Derby, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Nov. 5, 1975, Ser. No. 628,872

Int. Cl.² B64D *25/04*

U.S. Cl. 244—122 R **13 Claims**



10. A pilot seat adapted to be used in aircraft such as helicopters including:

1. a frame member adapted to be supported from the craft floor and including two side members and a top member extending therebetween in spaced relation to the floor,
2. at least two seat support members suspended vertically downwardly from said frame top member and extending parallel to the side members,
3. a seat pan connected to and supported from said support members, and
4. means connecting the bottom ends of said support members to said seat frame so that longitudinal loads are imparted to said seat frame, and so that limited relative lateral motion is permitted between said support members and said seat frame, and further so that said support members and said seat frame are structurally joined laterally when the relative lateral motion therebetween exceeds a preselected minimum.

4,003,535

MODULAR FURNITURE

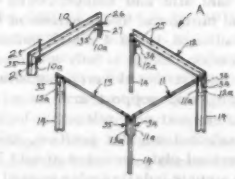
Carmelito B. Tianchon, 4769 Guadalcanal St., Sta. Mesa, Manila, Philippines

Filed Sept. 29, 1975, Ser. No. 617,610

Claims priority, application Philippines, July 10, 1975, 17367

Int. Cl.² F16M *11/16*; A47B *57/08*

U.S. Cl. 248—188 **7 Claims**



1. A modular multi-purpose furniture framework comprising four identical inverted U-shaped frame members each of which includes an elongated cross member and a pair of depending end members having oppositely bevelled faces, said

cross member and each of said end members being comprised of elongated flat boards with each of said end members being connected to the cross member by means of bevelled mitered finger joints, four elongated leg members having parallel flat faces with each of said leg members being secured between opposed surfaces of adjacent end members whereby said cross members will define a rectangular frame having a depending leg member at each corner.

4,003,536

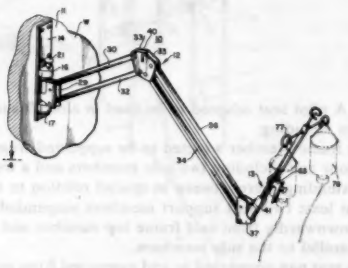
INTRAVENOUS BOTTLE SUPPORT ARM

Michael Sekerich, Spring Valley, N.Y., assignor to Grant Hardware Company, West Nyack, N.Y.

Continuation of Ser. No. 359,270, May 11, 1973, abandoned. This application June 27, 1975, Ser. No. 590,925

Int. Cl.² F16M *13/00*

U.S. Cl. 248—280 **7 Claims**



1. A support device comprising a wall mounting bracket, a horizontal linear extension linkage supported at its proximate end in said wall mounting bracket for swinging about a vertical axis and having a distal end restricted to a linear horizontal movement between a retracted position adjacent said proximate end and an extended position remote from said proximate end, said linkage comprising a pair of end to end proximate and distal parallelogram linkages, means connecting said parallelogram linkages at their adjacent upper ends, said parallelogram linkages depending from said connecting means and means coupling said parallelogram linkages to restrict the parallelogram linkages to similar corresponding opposite movements, said parallelogram linkages being in vertical juxtaposition with said connecting means being uppermost when said extension linkage is fully retracted, a support arm mounted to the bottom distal end of said distal parallelogram linkage and extending upwardly therefrom and being angularly adjustable about a horizontal axis transverse to the direction of extension of said extension linkage proximate to the inner end of said arm and independently of the extended position of said horizontal linear extension linkage, said arm being juxtapositioned to said distal parallelogram linkage when said extension linkage is fully retracted and said arm is adjusted to a fully retracted vertical position, spring means resiliently urging said support arm to a vertical position, means on said support arm releasably locking said support arm in a preselected angular position, said locking means comprises a vertical plate mounted at said linkage distal end and having an arcuate indexing edge coaxial with said support arm horizontal adjustment axis and a locking element mounted on and swingable with said support arm and selectively adjustable into and out of locked engagement with said indexing edge, and a bottle support member located on said support arm proximate its outer end.

4,003,537

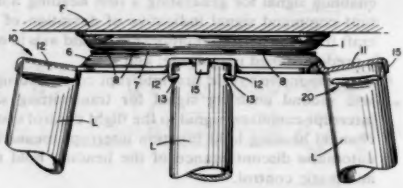
MOUNTINGS FOR TUBULAR METAL LEGS

Melvin Mutchnik, 5804 Gist Ave., Baltimore, Md. 21215

Filed Jan. 19, 1976, Ser. No. 650,354

Int. Cl.² F16M *13/00*

U.S. Cl. 248—425 **11 Claims**



1. In a mounting for a tubular metal supporting leg to the underside of a furniture unit,

a. bracket supporting means affixed to the underside of the furniture unit for detachable connection with said leg, comprising a sheet metal supporting plate with a pair of integral spaced arms extending downwardly from opposite sides of said plate for a short depth, and spaced from each other a distance slightly greater than the diameter of the leg at its upper end,

b. a narrow rigid flange extending inwardly from the free edge of each arm at an acute angle to the latter,

c. said leg adapted for slidable engagement with said bracket support and having upwardly directed slots spanning opposed parallel chords of said tubular leg, below the upper edge thereof, a distance corresponding to said short depth, with the upper end of said leg adapted to contact said supporting plate, said slots being disposed at opposite circumferential portions of said tubular leg to form a pair of coupling lips, each with a convexly-shaped boundary at each of said portions adjacent to an intended deformation in the leg below said lip and bounded by the slot inwardly of said lip, and each lip engaging one of said flanges at a re-entrant angle to attain an interlocking and secure engagement therebetween in a direction transverse to the initial relative reciprocable movement incident to the sliding of each lip into interengagement with its respective flange.

4,003,538

ARTICLE HOLDING DEVICE

Bruce J. Frye, 13601 69th Ave. N., R.R. No. 2, Osseo, Minn. 55369

Filed Sept. 2, 1975, Ser. No. 609,499

Int. Cl.² A44B *21/00*; **C09J** *7/02*; **B32B** *27/08*, *27/30*

U.S. Cl. 248—467 **7 Claims**

1. A separable article holding device, having in combination

a body portion comprising a resilient central layer conforming to a wall surface under pressure,

a flap portion integral with said layer and depending therefrom,

a thin non-stretchable layer of material overlying each side of central layer and adhering thereto,

one of said overlying layers having an adhesive coated outer surface,

a protective layer overlying said adhesive coated surface, and

an article holding means carried by said body portion.

6. An article-holding device comprising

a resilient central layer conforming to a wall surface under pressure,

a thin non-stretchable layer of material overlying each side of said central layer and adhering thereto,

an adhesive coating carried by an outer surface of one of said overlying layers,

a protective strip overlying said adhesive coating, and

an article-holding means comprising a hook carried by said central layer.

7. An article-holding device, having in combination

a central layer of material of sufficient resilience to conform to a wall surface under pressure,

a flap portion integral with said layer and depending therefrom,

a thin non-stretchable layer of material overlying each side of said central layer and adhering thereto, and

an adhesive coating carried on the outer surface of each of said overlying layers,

whereby one of said overlying layers is securable to a supporting surface and the other of said overlying layers forms an article-holding means.

4,003,539

WALL HANGING DEVICE

Kenneth H. Gutner, 3285 Dato, Highland Park, Ill. 60035

Filed Jan. 26, 1976, Ser. No. 652,503

Int. Cl.² F16M *13/00*

U.S. Cl. 248—489 **4 Claims**

1. A device for hanging objects from a wall comprising a centrally-apertured, generally flat first part and a relatively elongated, flat second part, said second part having one end folded on itself about a discrete radius of curvature to provide a looped end portion, said first part being mounted within said looped end, said looped end portion being equipped with integral, laterally extending integral tabs folded on themselves and clinchingly embracing said second part to frictionally contact said second part immediately adjacent said looped end portion to stabilize said looped end portion against opening, said second part having at least one opening to accept means to secure said second member to a flat surface.

4,003,540

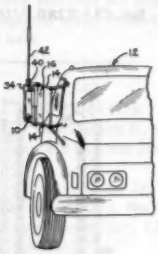
AERIAL MOUNT

Herbert H. Hawks, Syracuse, Ind., assignor to Nite Hawk Enterprises, Inc., Syracuse, Ind.

Filed Oct. 31, 1975, Ser. No. 627,592

Int. Cl.² F16M *13/00*

U.S. Cl. 248—539 **4 Claims**



1. A detachable aerial mount for snap-on attachment to structure of a motor vehicle such as the external rear view mirror brackets, comprising a pair of telescoping members adapted to be mounted in vertical arrangement and having clasp means at the remote ends thereof, spring means urging said telescoping members together so that said clasp means can clamp said structure therebetween in response to the urging of said spring means, and an aerial mounting bracket on the upper one of said telescoping members on which an aerial can be mounted, said mounting bracket including a plate closing the upper end of said upper telescoping member and extending laterally therefrom and having a return-bent portion from its outer end which defines a closed loop below the plate on the side of said upper telescoping member, said plate having an aperture therein for mounting an aerial receptacle thereon within the confines of said loop.

4,003,541

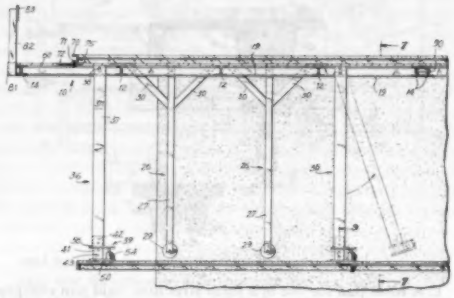
PORTABLE DECKING FORM

John E. Lanier, 495 S. Atlantic Ave., Cocoa Beach, Fla. 32931

Filed May 20, 1974, Ser. No. 471,315

Int. Cl.² E04G *11/38*

U.S. Cl. 249—18 **18 Claims**



1. A unitary portable decking form having a continuous upper surface for the support of a monolithic slab of poured concrete during setting thereof, for use in conjunction with a plurality of other like units for the formation of a monolithic roof structure for a plurality of modular building units separated by vertical support walls, the unitary portable decking form comprising:

A. a gridlike network of interconnecting structural support members, the top surfaces of all the support members being substantially level and coplanar;

B. first ground-engaging support means for the gridlike network and operatively connected thereto, the first ground-engaging support means comprising movable means connected to the bottom portion thereof to permit movement of the portable decking form over a horizontal surface;

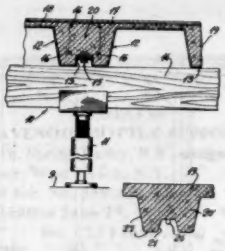
C. second ground-engaging support means for the gridlike network and operatively connected thereto, the second ground-engaging support means comprising vertically adjustable elevating means secured to the bottom portion thereof and serving to raise and lower the support network between a first lower position, wherein the gridlike network is supported by the first ground-engaging support means and in which the decking form can be moved, and a second, raised position, wherein the gridlike network is supported by the second ground-engaging means in a stationary manner and the first support means is lifted from the support surface, said second ground-engaging support means further comprising a vertically extending girder movably connected at its upper portion to the gridlike network so as to permit moving the second ground-engaging support means out of contact with the ground, when the decking means is supported by the first ground-engaging means, the vertical girder of the second ground-engaging support means being a substantially hollow member, and the vertically adjustable elevating means comprising a hollow lower member telescopically interfitted, and relatively slidable, with the lower portion of the girder, and a jacking means having a base and a movable column means extending therefrom, the base being connected to one of the girder and the hollow lower member and the column means being connected to the other; and

D. a substantially flat, thin plate resting upon and supported by the upper surfaces of the gridlike network and providing a continuous, flat and level, upper surface for supporting wet concrete.

4,003,542
FORM PANS FOR CONSTRUCTING RIBBED SLAB STRUCTURES

Issie M. Beer, 7514 Guelph Road, Cote St. Luc, Quebec, and Zenon A. Zelinski, 3170 Place de Ramezay, Montreal, Quebec, Canada

Filed Sept. 22, 1975, Ser. No. 615,213
Int. Cl.² E04G 11/40
U.S. Cl. 249—31 20 Claims

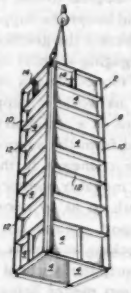


1. A form pan for use in a form structure, said pan comprising a unitary shell having a top wall, opposed elongated side walls and end walls; a peripheral flange formed about a free end of said side and end walls, said flange having a load supporting section extending outwardly from said side and end walls and a connection section extending from said load supporting section to permit interlocking with an adjacent pan, said connection section is elevated from said load supporting section in a direction toward said top wall and spaced from said side and end walls for the formation of a recessed joint in a rib of a concrete structure formed between adjacent pans.

4,003,543
COLUMN LIFT BRACKET

Max Doubleday, Hackensack, N.J., and Douglas M. Demarest, Port Washington, N.Y., assignors to Harsco Corporation, Harrisburg, Pa.

Filed July 14, 1975, Ser. No. 595,482
Int. Cl.² E04G 13/02, 17/00
U.S. Cl. 249—48 2 Claims

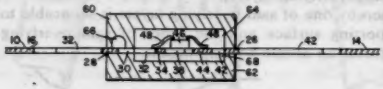


1. A corner bracket for a concrete column mold comprising:
a. an angle iron bar having a pair of legs;
b. each of said legs having a plurality of slots which align with similar slots on the other of said legs;
c. a lifting connection at the upper most end of said angle iron bar for lifting a completed column and
d. said lifting connection including said upper most ends of said angle iron bar being in contact in a flattened area to receive a hoist line coupling.

4,003,544
GATELESS INJECTION MOLD FOR ENCAPSULATING SEMICONDUCTOR DEVICES

Thomas G. Bliven, Scottsdale, and John R. Hugill, Phoenix, both of Ariz., assignors to Motorola, Inc., Chicago, Ill.

Continuation of Ser. No. 388,620, June 11, 1973, abandoned, which is a division of Ser. No. 79,601, Oct. 9, 1970, Pat. No. 3,753,634. This application Mar. 24, 1975, Ser. No. 561,203
Int. Cl.² B29C 6/00
U.S. Cl. 249—95 4 Claims

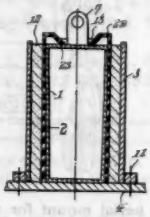


1. In a gateless mold having a plurality of cavities therein, each for reception of an electrical unit attached to a frame member in order that such unit can be plastic encapsulated in said cavities, said mold having a runner groove adjacent such cavities for receiving liquid plastic that is introduced under pressure into said mold and into said cavities from the runner groove in a controlled manner through a gate opening of a predetermined size, said mold itself having no such gate opening of a predetermined size extending from said runner groove to each said cavity to provide for such introduction of plastic under pressure into each cavity, said gateless mold comprising at least two parts to be closed together for a molding operation and being adapted to have a frame member having gates therein positioned between said two parts when the mold is closed for a molding operation with said frame member adapted to fit over the mold runner groove and each cavity in a position such that the flow of liquid plastic passes from said runner groove to said cavities through said frame member gates.

4,003,545
CORE MEANS HAVING A RUBBER LINER

Minoru Tanaka, 148 Nemoto, Matsudo, Chiba, Japan

Filed Sept. 13, 1974, Ser. No. 505,922
Claims priority, application Japan, Sept. 21, 1973, 48-105876
Int. Cl.² B28B 7/36
U.S. Cl. 249—112 2 Claims



1. A core device used in a moulding flask for making prefabricated concrete product, said device comprising
a hollow tubular member formed from a rigid material and having an outer surface,
a thin layer of rubber freely laid over the outer surface of said hollow tubular member,
said thin layer of rubber having an outer surface for engaging and retaining concrete mixture poured into said moulding flask,
said outer surface of the hollow tubular member being a truncated conical surface diverging toward the upper end of the tubular member,
said thin layer of rubber having an inside surface which is a

truncated conical surface diverging toward the upper end of the tubular member so as to mate with the outer surface of the hollow tubular member, and

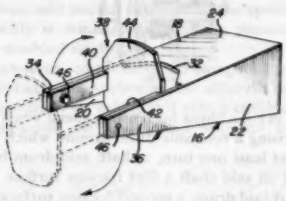
further said thin layer being secured at its upper edge portion to the top of the tubular member and having a bent portion protruding above the upper end of the tubular member, extending radially inwardly, and sloping downwardly to the upper edge portion of the thin layer of rubber.

4,003,546

CONVERTIBLE WALER BRACE

Calvin R. Johnson, 2711 Winston Ave., Las Cruces, N. Mex. 88001

Filed Aug. 6, 1975, Ser. No. 602,304
Int. Cl.² E04G 17/04
U.S. Cl. 249—219 W **8 Claims**



1. A convertible waler brace, said brace comprising an elongated horizontal brace member having one inner end adapted to abut the exterior surface of a form wall, said brace member including means defining a generally horizontal support portion extending along its upper portion, and upstanding waler retaining means supported from said brace member extending transversely of said brace member and projecting above said horizontal support portion, said waler retaining means and said horizontal brace member including co-acting means mounting said waler retaining means for shifting between predetermined first and second waler retaining positions spaced different distances from said one end of said brace member, said waler retaining means being pivotally supported from said brace member for angular displacement between said first and second waler retaining positions about a horizontal transverse axis.

4,003,547

VALVE OPERATOR

Francis H. Snyder, Newton, and Francis H. Snyder, Jr., Brookfield, both of Conn., assignors to Lone Star Industries, Inc., Greenwich, Conn.

Continuation of Ser. No. 266,231, June 26, 1972, abandoned, which is a continuation-in-part of Ser. No. 170,088, Aug. 9, 1971, abandoned. This application Dec. 13, 1974, Ser. No. 532,637
Int. Cl.² F16K 31/16; F15B 15/26
U.S. Cl. 251—31 **22 Claims**

1. A fast operator for operating a movable element, said operator comprising:

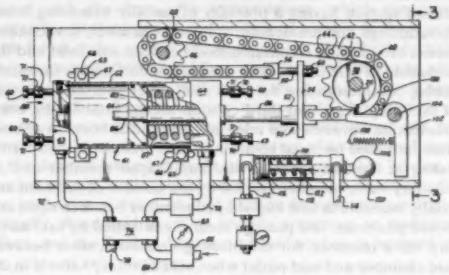
operator means connectible to said movable element;

pneumatically powered actuator means connected to said operator means for moving said operator means rapidly in one direction;

fluid conduit means for admitting compressed pneumatic pressurizing fluid to said actuator means for powering said actuator means;

restraining means for preventing movement of said actuator means and said operator means in said one direction during and after admission of said compressed pneumatic pressurizing fluid, to place and maintain said actuator means in a fully pressurized cocked condition until released; and

release means unaffected by the admission of said pneumatic pressurizing fluid to said actuator means co-acting with said restraining means and selectively operable to essentially instantaneously release said restraining means, release of said restraining means permitting said compressed pressurizing fluid to expand and rapidly move



said actuator means to thereby impart rapid movement in said one direction to said operator means, and

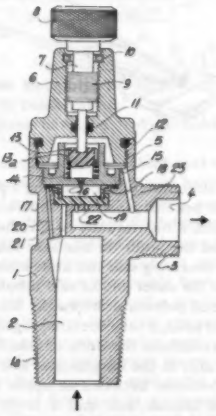
valve means operable to vent said pneumatic pressurizing fluid from said actuator means after each actuation thereof, whereby said actuator means may be easily returned to its original position without overcoming the opposing force of said pressurizing fluid.

4,003,548

HIGH-PRESSURE VALVE WITH BALANCED INTERNAL COMPONENTS

Giuseppe Stradella, and Umberto Stradella, both of 13, Via Roma, Genova, Italy

Filed Nov. 4, 1975, Ser. No. 628,788
Claims priority, application Italy, Nov. 15, 1974, 13049/74; Mar. 26, 1975, 12531/75
Int. Cl.² F16K 31/385
U.S. Cl. 251—45 **6 Claims**



1. A high-pressure valve with balanced internal components, particularly sensitive and operable with little effort, designed for use on compressed gas bottles or the like, and comprising an elongated main body having a lower inlet for connection with the bottle and an outlet for connection with a dispensing device; a cup-shaped member in said main body portion; a chamber in said main body beneath said cup-shaped member and having a planar bottom surface, a valve diaphragm mounted in said chamber on said planar surface for

movement between a normal position wherein the diaphragm lies against the planar surface and a raised position wherein the underside of the diaphragm rises above the planar surface, a lock ring between said cup-shaped member and said diaphragm and bearing against said diaphragm to hold said diaphragm in place, said lock ring having a first section of one diameter and a second section of reduced diameter, said second section having a plurality of radially extending bores therethrough communicating with said chamber, first conduit means establishing communication between said inlet and the underside of said diaphragm, second conduit means for establishing communication between said outlet and the underside of said diaphragm and third conduit means establishing communication between said inlet and said radial bores; a control stem mounted for axial rotation in said main body and terminating at least adjacent to said cup-shaped member and an auxiliary valve member carried by the bottom of the stem and axially movable in said cup-shaped member between open and closed positions; and passage means, controlled by said auxiliary valve member, for establishing communication between said chamber and said outlet when said auxiliary valve is in the open position; said diaphragm being operable, when said valve is installed in a compressed gas bottle, to remain in its normal position against said planar surface when the auxiliary valve is in the closed position and to move to its raised position when the auxiliary valve is in the open position, whereby when the diaphragm is in the raised position, gas is dispensed from the inlet to the outlet via said first and second conduit means.

4,003,549

CARPET STRETCHER TOOL

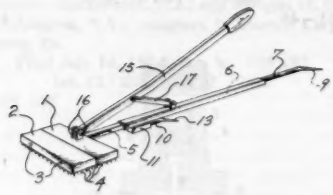
Fernand Sergerie, 629 Dieppe St., Timmins, Ontario, Canada

Filed Apr. 9, 1975, Ser. No. 566,250

Claims priority, application Canada, Apr. 19, 1974, 197862

Int. Cl.² A47G *27/04*

U.S. Cl. 254—62 **5 Claims**



1. A carpet stretcher tool comprising a pad-like head having several pointed needles projecting downwardly and adapted to engage a carpet, a rod secured to said head, projecting endwise away from the latter on one side thereof, a tubular arm telescopically receiving said rod at its inner end, a first needle bar secured to the outer end of said tubular arm and having a pointed free end portion downwardly inclined in a direction away from said head, a tube section hinged to said tubular arm at a point intermediate the ends of said tubular arm about a hinge axis parallel to the longitudinal axis of said tubular arm for pivotal movement between an upper inoperative position alongside said tubular arm and a lower operative position underneath said tubular arm, a second needle bar secured to said tube section and having a pointed free end portion downwardly inclined in a direction away from said head in the lower operative position of said tube section, and manually-operated toggle lever means connected to said head and tubular arm to displace said head away from said tubular arm, while being guided by said rod sliding in said tubular arm, said needle bars selectively adapted to pierce a carpet and the underlying floor to act as a reaction point for stretching said carpet away from said point by means of said carpet-engaging needles.

4,003,550

DEVICE IN ROPE HOISTS FOR LIMITING SPEED WHEN LOWERING A LOAD

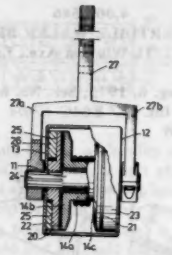
Eric Brodin, 44, Blvd. d'Italie, Monte Carlo, Monaco

Filed July 14, 1975, Ser. No. 595,724

Claims priority, application Sweden, July 18, 1974, 7409420

Int. Cl.² B66D *5/00*

U.S. Cl. 254—151 **9 Claims**



1. A device in rope hoists for limiting speed when a lowering a load, comprising a rotatable drum around which the rope is to be wound at least one turn; a shaft, said drum being rotatably mounted on said shaft a first friction surface on at least one end side of said drum; a second friction surface, unrotatable in relation to said shaft; means for moving said first and second friction surfaces into engagement with each other automatically in response to the load, so that the friction force between said friction surfaces is proportional to the weight of the load to be conveyed; said second friction surface being a disc parallel with the frictional end side of said drum and said disc being shiftably but unrotatably mounted on said shaft; a casing in which said drum shaft is pivotably mounted; a spring-biased arm rigidly attached to said drum shaft and arranged to carry the load, so that said drum shaft is turned when the arm is turned due to the load and said friction disc on the side facing away from said drum being provided with at least one helical surface extending over an angle which is at least as great as the turning angle of said drum shaft; and a fixed abutment arranged to engage with said helical surface so that said disc is shifted towards said drum for increasing engagement with said drum friction surface when said arm is turned on being loaded.

4,003,551

WINCH-HOIST

Bernard E. Wallace, Exton, Pa., assignor to B. E. Wallace Products Corporation, Malvern, Pa.

Continuation of Ser. No. 453,919, March 22, 1974, abandoned. This application Nov. 6, 1975, Ser. No. 629,262

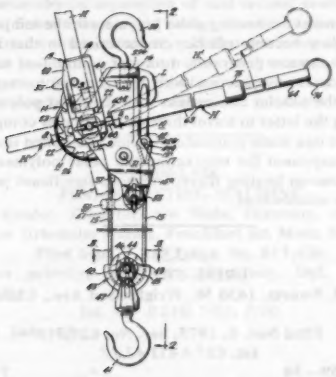
Int. Cl.² B66D *1/00*

U.S. Cl. 254—169 **18 Claims**

1. Winch-hoist apparatus, comprising: a frame having anchor means adjacent one end thereof; a drum rotably mounted on said frame; generally U-shaped lever means having a pair of arms between which said drum and frame are received, said arms being pivotally connected to said frame for swinging movements of said lever means about the rotational axis of said drum; ratchet and pawl mechanism responsive to swinging movements of said lever means to effect rotation of said drum in one direction, or, alternately, to permit controlled rotation of said drum in the opposite direction when under load; a cable; means coupling one end portion of the cable to the drum to accommodate reeling and unreeling of the cable under the control of such swinging movements of said lever means, and with freedom for release and replacement of the cable in the field, said coupling means including a pair of cable-containing tubular passages, spaced axially along the drum, each passage extending from the drum surface into the

drum in a direction transverse the drum axis, and at least one passage extending completely through said drum, the construction and arrangement being such that the cable has spaced portions disposed within said passages, the portion in said one passage extending completely through said drum, and a snubbing portion, intermediate said spaced portions, wrapped generally helically about said drum to snub and thus anchor the cable thereon, and the construction further including cable securement means associated with at least one of said passages and bearing against the side of cable disposed within that passage; a load-carrying assembly disposed to depend from a loop of the cable when the apparatus is in use under a doubled, basic, rigging condition; a load-bearing means adjacent an end of the cable and adapted to provide for such looping of said cable and consequent multiplication of the lifting force; and support means to which said load-bearing means may be releasably secured, said support means being carried by said frame in the region of that end of said frame which cooperates with said anchor means, whereby the distance between said anchor means and the specified load-carrying assembly is minimized when the apparatus is in use under said doubled rigging condition.

6. A winch-hoist, comprising: an elongated frame having a major central axis and anchor means adjacent one end of said frame and generally on said major axis; a cable-carrying drum rotatably mounted on said frame with its rotational axis



spaced-away from said one end of said frame, and disposed laterally of said major axis; generally U-shaped lever means having a pair of arms between which said drum is received, said arms being pivotally connected to said frame, and extending laterally away from one side of said frame, for swinging movements of said lever means about the rotational axis of said drum; ratchet and pawl mechanism responsive to swinging movements of said lever means to effect incremental rotation of said drum in one direction or, alternatively, to permit controlled incremental rotation of said drum in the opposite direction when under load; said drum having means for attachment of a snubbing end portion of a cable, the major portion of the cable being subject to reeling and unreeling with respect to said drum; load-bearing means adjacent the other end of the cable when the apparatus is in use under at least one normal, basic, rigging condition; and a support with which said last means is alternatively cooperative so as to provide for looping of the cable and consequent multiplication of the lifting force, the looped cable extending from said drum closely along one side of said major axis and then returning closely along the other side of said major axis toward said one end of said frame, said support being located at and secured to a side of said frame opposite to said one side, in a position for releasable securement of said load-bearing means to said frame in the region of that end of said frame immediately adjacent to said anchor means, and above the cable-supporting surface of said drum.

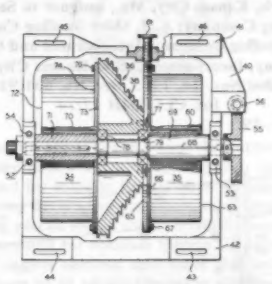
14. In a winch-hoist of the type including a supporting frame, a drum rotatably mounted on said frame, lever means pivotably connected to said frame for swinging movements about the rotational axis of said drum, and ratchet and pawl mechanism responsive to swinging movements of said lever means to rotate said drum and alternatively to control opposite rotation thereof, whereby to reel and unreel cable associated with the drum, the improvements which comprise: means for anchoring one end section of a cable to the drum, with freedom for release and replacement of such cable, said last means including a pair of passages for receiving cable, said passages being spaced axially along the drum and each passage extending from the drum surface into the drum in a direction transverse the drum axis; the construction and arrangement being such that an end section of a cable anchored to the drum is passed through one of said passages leaving a portion of said section within said passage, and an intermediate anchoring portion of said section is wrapped generally helically about said drum to provide a capstan or snubbing effect, and the final end portion of said section is inserted in the other of said passages.

4,003,552

COUNTERPOISING LOAD SUPPORT APPARATUS AND METHOD

Valentine S. Sobolewski, Muskego, Wis., assignor to General Electric Company, Schenectady, N.Y.

Filed May 5, 1975, Ser. No. 574,581
Int. Cl.[2] B66C *23/72*
U.S. Cl. 254—178 17 Claims



1. A counterpoise assembly for supporting a load, said assembly including in combination:

torsion spring means having a first anchored end and a second end,

rotatably mounted cam means to which said second end of said spring means is connected and having an axially extending spiral groove of continuously varying radius,

a load supporting cable arranged for being wound on and unwound from said cam means and having a first end for connection to said cam means and a second end for connection to a load that is movable between an initial distance from said cam means and a predetermined distance more remote from said cam means while being counterpoised by said torsion spring, and

said cam means including attachment means for establishing an initial tangent point for said cable on said spiral groove to support a first load in a counterpoised state throughout the distance between said initial and more remote distance wherein the turns versus torque characteristic of said spring means comes within its useful range, said attachment means including means for reestablishing said initial tangent point as required to support loads differing from said first load so that said turns versus torque characteristic of said spring means may remain within said useful range.

15. A method of conditioning load supporting apparatus to provide counterpoised support for a selected load weight in a

permissible range of load weights acceptable respectively by said apparatus for being moved vertically over a substantially the same distance, wherein said apparatus includes a generally axially tapered cam having in its periphery a spiral cable groove of continuously changing radius extending from its small radius end to its large radius end and with an annular excess cable storage portion of substantially constant radius adjacent said spiral groove at the large radius end of said cam, and said cam is journaled for rotation and coupled with a counterpoising torsion spring, and the cable used is long enough to extend over the entire active length of said spiral groove when accommodating the heaviest load in said range, said method comprising the steps of:

relieving the load from said cable and reducing the torque on said spring,

winding one end of said cable in said storage portion selectively from zero to as many turns as will permit said cable to be wound in said spiral groove until it reaches a point of tangency with said groove from which said cable extends to said load where the intended stress in the cable due to the selected load acting over the radius of said cam at said point will be substantially equal to the torque of said spring means at the beginning of the useful range of said spring means in its torque versus spring turns characteristic,

attaching said one end of said cable to said cam, and

winding said spring until its torque is substantially the torque which it has at the beginning of its useful range.

4,003,553

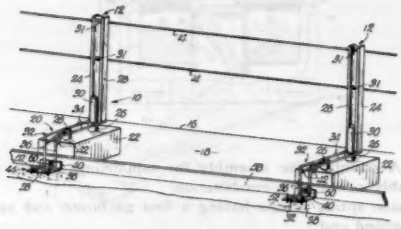
GUARDRAIL POST ASSEMBLY

Paul L. Morris, Kansas City, Mo., assignor to Sellers & Marquis Roofing Company; A. J. Shirk Roofing Company, Inc.; Western Roofing Company, Incorporated and Quality Roofing Company, Incorporated, all of Kansas City, Mo.

Filed Nov. 14, 1975, Ser. No. 631,918

Int. Cl.² E04H *17/14*

U.S. Cl. 256—59 **6 Claims**



1. A guardrail post, comprising:

a post assembly including a movable base comprising a block formed of concrete adapted for shiftable positioning on a support surface, a pair of spaced, post member-receiving pipe members secured to said block and extending upwardly from the upper surface thereof, and an upright post member mounted on said base and received by one of said pipe members; and

means for preventing tipping of said post assembly, including

brace means secured to said post assembly and extending to a point adjacent said support surface, said brace means comprising a pair of spaced, adjacent, generally parallel metallic members each secured to said pipe members and having depending sections extending towards said support surface, with apertured bracket means interconnecting said depending sections adjacent said support surface;

hold-down means temporarily secured to said support surface adjacent said point thereon and comprising a pair of adjacent stick clips each having an upright extension thereon, said extension being received within respective apertures in said bracket means; and

means operatively coupling said brace means and hold-down means for preventing tipping of said guardrail post, said coupling means comprising a clip secured to said bracket means adjacent each of said extension-receiving apertures for releasably holding the extensions therein.

4,003,554

EQUIPMENT FOR HEATING POLAR POLYMERS TO THE TEMPERATURE AT WHICH THEY BECOME PLASTIC

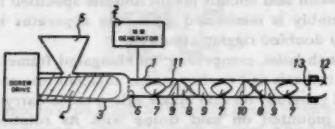
Jean Chauffoureaux, Bierges, Belgium, assignor to Solvay & Cie, Brussels, Belgium

Filed Feb. 12, 1975, Ser. No. 549,209

Claims priority, application Luxembourg, Mar. 4, 1974, 69549

Int. Cl.² B01F *15/00;* **H05B** *9/06*

U.S. Cl. 259—4 AC **13 Claims**



1. Equipment for heating polar polymers to the temperature at which they become plastic, characterised in that it comprises a microwave generator, a tubular component acting as a waveguide in conjunction with the generator, means for supplying the tubular component with the polar polymer and for causing the latter to travel through the tubular component, and at least one static malaxating device positioned inside the tubular component for malaxating the polar polymer which prevents uneven heating thereof without significant pertubation of the microwaves.

4,003,555

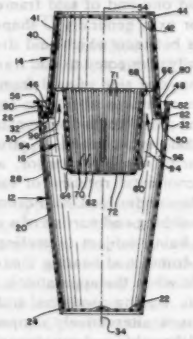
DRINK SHAKER

William M. Swartz, 1430 W. Wrightwood Ave., Chicago, Ill. 60614

Filed Nov. 6, 1975, Ser. No. 629,375

Int. Cl.² A47J *43/27*

U.S. Cl. 259—54 **7 Claims**



4. A drink shaker comprising:

a first cupped container,

a second cupped container,

said containers each defining a circumambient side closed at one end of same and open at the other end of same,

a basket member defining a circumambient side wall having one end of same open and the other end of same closed by a foraminous panel portion,

means for supporting said basket member within and on

said first container in a predetermined operative position therein with the basket member other end directed toward said first container closed end,

said basket member being formed to be freely receivable within said first container to its said operative position,

said basket member open end being formed for removable plug type slip fit entry into and frictional securement to said second container open end,

and said open ends of said containers being formed for removable liquid sealing plug type slip fit and frictional securement of one of said container open ends within the other container open end,

said basket member side wall being foraminously formed for free passage of liquid therethrough,

whereby liquids and solids to be mixed may be applied to the shaker by disposing the liquids in said first container and the solids in the basket member, with the basket member being disposed in said operative position thereof in the first container on said support means with said basket member other end directed toward said first container closed end, and said second container being pressed into said frictional securement with said first container and said basket member, and on shaking the shaker longitudinally thereof, the liquid passes through the basket panel portion and side wall to admix with the solids in the basket member from both sides of said basket member,

and whereby on separation of said second container from said first container, said basket member remains with said second container to free said first container open end of said basket member, and when said second container is disposed in an upright position, drippings from said basket member drain into said second container.

4,003,556

FLAME-CUTTING MACHINE

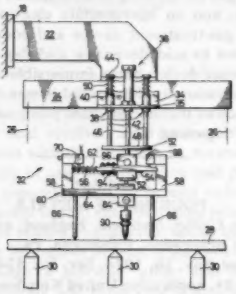
Georg Roeder, Frankfurt am Main, Germany, assignor to Messer Griesheim GmbH, Frankfurt am Main, Germany

Filed Sept. 9, 1975, Ser. No. 611,636

Claims priority, application Germany, Oct. 2, 1974, 2447035

Int. Cl.² B23K 7/02, 7/10

U.S. Cl. 266—48 **15 Claims**



1. In a flame cutting machine for welding seam preparation comprising a traveling carriage provided with a transverse track, at least one torch carriage with at least one torch unit arranged movably on the transverse track with at least one cutting torch, and a scrap cutting arrangement with at least one scrap cutting torch, the improvement comprising said scrap cutting arrangement being mounted directly on said torch unit and movable therewith, said scrap cutting arrangement being further provided with means to move said scrap cutting torch relative to said torch unit, whereby the speed at which said scrap cutting torch is moved is directly proportional to the speed at which said cutting torch moves.

3. In a flame cutting machine for welding seam preparation, comprising a traveling carriage provided with a transverse track and of at least one torch carriage with at least one torch unit arranged movably on the transverse track with at least one cutting torch as well as with a scrap cutting arrangement, the improvement comprising said scrap cutting arrangement being mounted directly on said torch unit, said scrap cutting arrangement being activated in accordance with the movement of said flame cutting machine, said scrap cutting arrangement being arranged on a carrier held by said torch carriage at the end of which said cutting torch is mounted for said welding seam preparation, said scrap cutting arrangement having a frame attachable on a workpiece and a scrap-cutting torch being arranged movably in said frame.

4,003,557

DEVICE FOR THE CEMENTATION OF METALS BY LIQUID AMALGAMS

Michal Babinsky, Ziar nad Hronom, Czechoslovakia, assignor to Zavod Slovenskeho narodneho povstania, narodny podnik, Ziar nad Hronom, Czechoslovakia

Continuation-in-part of Ser. No. 223,521, Feb. 4, 1972, abandoned. This application Nov. 4, 1974, Ser. No. 520,618

Int. Cl.² C22B 11/04

U.S. Cl. 266—169 **9 Claims**

1. Cementation apparatus in which the improvement comprises an outer hollow cylinder, at least two inner cylinders freely mounted for rotation in said outer cylinder, said inner cylinders having decreasing diameters, each smaller diameter cylinder being placed within the next larger diameter cylinder and freely mounted for rotation therein, a solution of noble metal in the region between said inner and outer cylinders, and an amalgam of an alkaline metal in said region whereby rotation of said outer cylinder will rotate said inner cylinders to cause said amalgam and said solution to coat the walls of said inner and outer cylinders.

3. Cementation apparatus comprising an outer cylinder, a plurality of perforated inner cylinders of decreasing diameter, each inner cylinder being positioned for free rotation inside the next larger diameter cylinder, a solution of a noble metal having impurities and an amalgam of an alkaline metal in said cylinders sufficient in volume to cover a portion of the inner surface of the smallest inner cylinder.

4,003,558

SUPPORTING STRUCTURE FOR BLAST FURNACES

Harold B. Elsasser, Mount Lebanon Township, Allegheny County; James F. Gunion, McCandless Township, Allegheny County; Melvin L. Huerter, and Andrew L. Poulos, both of Upper St. Clair Township, Allegheny County, all of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

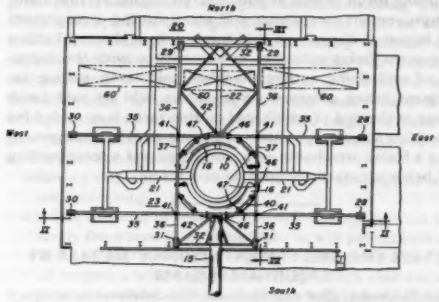
Filed Apr. 7, 1976, Ser. No. 674,353

Int. Cl.² C21B 7/00

U.S. Cl. 266—198 **10 Claims**

1. The combination, with a blast furnace which includes a mantle and a stack supported on said mantle, of an improved supporting structure for said mantle and said stack, said structure comprising a plurality of columns spaced a substantial distance from said furnaces and arranged in a pattern thereabout, trusses supported on said columns and spanning the

spaces therebetween outside said furnace, a pair of girders supported on certain of said columns and spanning the spaces therebetween beneath said trusses, a frame carried by said



girders surrounding said furnace above said mantle, tension members connecting said trusses and said frame, and hangers suspended from said frame and connected to said mantle.

4,003,559

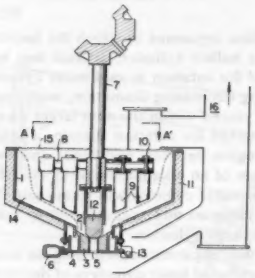
APPARATUS FOR RECOVERY OF METALLIC ZINC FROM DROSS

Kiyoharu Kuwano, Tamano, and Yukio Kanbara, Shimonoseki, both of Japan, assignors to Mitsui Mining & Smelting Co., Ltd., Tokyo, Japan

Filed Apr. 24, 1975, Ser. No. 571,173

Int. Cl.² C22B 9/02

U.S. Cl. 266—204 **7 Claims**



1. Apparatus for recovering metallic zinc from dross discharged from a zinc melting furnace, comprising:

a. a saucer-like container for receiving dross, said container having a generally truncated conical bottom with an opening through the truncated apex;

b. a vertical rotary shaft extending into said container;

c. a plurality of agitating scraper plates attached to said rotary shaft so as to rotate therewith within said container and separate metallic zinc from the dross;

d. a plug having a hollow, cylindrical shape inserted into the opening through the bottom of the container;

e. attachment means to attach said plug to the bottom of the container such that it may be removed from the opening to allow drainage of the secondary dross, from which the zinc has been removed, from the container;

f. a rotor attached to the lowermost end of said rotary shaft, the lowermost portion of the rotor and the uppermost portion of said plug defining a slight aperture so as to allow only the passage of separated zinc between the rotor and the plug and, subsequently, through the hollow plug.

g. wherein the scraper plates provide a clearance sufficient to form a thick insulating and protective layer of dross along the wall of the container between the wall of the container and each scraper plate whereby said insulating and protective layer of dross, formed at said wall, prevents corrosion of said wall by the molten metallic zinc and maintains the temperature of the dross within the separator.

4,003,560

GAS-TREATMENT PLANT FOR MOLTEN METAL

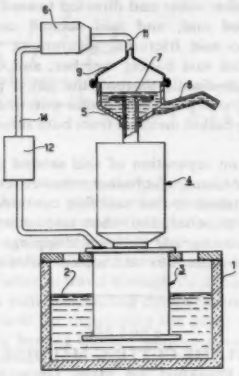
Henri Carbonnel, Antony, France, assignor to Groupement pour les Activities Atomiques et Advancees "GAAA", Le Plessis Robinson, France

Filed May 12, 1976, Ser. No. 685,609

Claims priority, application France, May 27, 1975, 75.16422

Int. Cl.² C22B 21/06

U.S. Cl. 266—217 **9 Claims**



1. Gas-treatment plant for molten metal comprising a gas-treatment device in the form of an electromagnetic pump having a pipe of porous material forming a bore surrounded by a metal tube and sealed thereto to form a chamber around the porous material, means connecting said chamber to a source of pressurized gas for treating molten metal, a decanting and degassing tank, and an intermediate electromagnetic pump overlying said gas-treatment device and connecting the gas-treatment device to said decanting and degassing tank, and said gas-treatment device being immersible in molten metal whereby; in operation, molten metal passes through the gas-treatment device to the intermediate pump and thence to the decanting and degassing tank.

4,003,561

POURING OF METALS

Joseph William Cudby, Sheffield, England, assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Nov. 18, 1974, Ser. No. 524,916

Claims priority, application United Kingdom, Nov. 23, 1973, 54418/73

Int. Cl.² F16K 51/00

U.S. Cl. 266—220 **3 Claims**

1. In a slidable gate member for controlling flow of liquid metal through an outlet in the bottom wall of a vessel, said member comprising:

metal encased superposed upper and lower refractory rings having an orifice;

the refractory of said upper ring being abrasion resistant for sliding contact with a plate thereabove;

the refractory of said lower ring being of low conductivity;

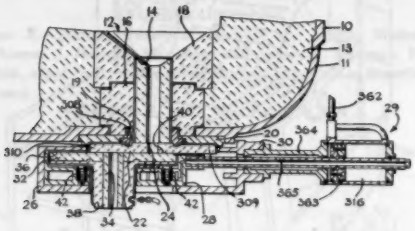
a nozzle depending from said plate and having a passage extending from said orifice;

the improvement in which said nozzle comprises:

an annular member of low-conductivity permeable refractory material extending from said lower ring;

a metal casing enclosing the outer circumference of said annular member;

a sleeve of highly erosion resistant permeable refractory inside said annular member and having a bore which defines said passage;



an inlet connected with said annular member and extending through said casing for introducing gas to said sleeve and through the permeable refractory thereof to said bore throughout the length of said sleeve to form a separating film between the metal being poured and the inside surface of said sleeve; and

means forming a seal at the lower surface of said annular member to prevent escape of gas.

4,003,562

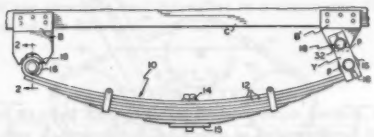
LUBRICATED SPRING BEARING UNIT

Terrence S. Kaiser, Owosso, and William A. Miller, Reese, both of Mich., assignors to V. W. Kaiser Engineering, Inc., Millington, Mich.

Filed Oct. 23, 1973, Ser. No. 408,813

Int. Cl.² F16C *11/12, 33/74;* F16F *1/28;* F16J *15/34*

U.S. Cl. 267—54 R **12 Claims**



1. A bearing unit, comprising; a cylindrical shell receiving and having a bearing pin journalled therewithin, an enlarged diameter end portion within one end of said shell having a resilient annular seal received and retained therewithin for sealing engagement with the bearing pin, means for admitting lubricant internally of said seal retaining end portion, retaining rings means separably carried in said enlarged diameter end portion outboard of said seal for axially retaining said seal in said shell and in sealing engagement about the pin, and said ring means being formed to provide a gap between enclosing ends for the passage of lubricant under said seal and therethrough in the flushing and repacking of the unit with lubricant under pressure.

4,003,563

SPRING ASSEMBLY AND ELEMENTS

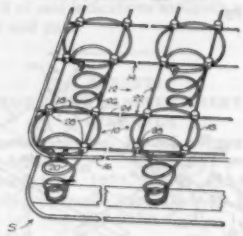
George E. Taylor, Wood Dale, Ill., assignor to Nachman Corporation, Des Plaines, Ill.

Filed Sept. 4, 1975, Ser. No. 610,106

Int. Cl.² F16F *3/02;* A47C *23/02*

U.S. Cl. 267—100 **14 Claims**

1. In a spring assembly having a grid formed of a plurality of parallel spaced wires extending in one direction and crisscrossing with a plurality of parallel spaced wires extending in a crosswise direction with the wires closely adjacent one another at their respective cross-over points, and a plurality of spring members having terminal portions and means connecting the terminal portions of the spring members to the grid at cross-over points, the improvement wherein the said means comprises a plastic member which completely encloses the adjacent wires of the grid at cross-over points to fix the wires



at the cross-over points, and a groove extending continuously across a portion of the plastic member above the wires and an entrant slot extending from the surface of the plastic member to the groove for guiding the terminal portion of the spring member into gripping relation within the groove.

4,003,564

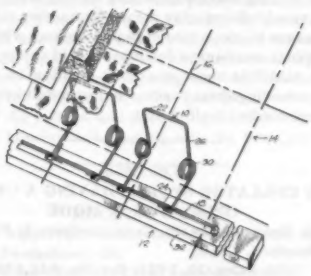
MEANS MOUNTING TORSION SPRINGS

George E. Taylor, Wood Dale, Ill., assignor to Nachman Corporation, Des Plaines, Ill.

Filed Sept. 4, 1975, Ser. No. 610,108

Int. Cl.² F16F *3/02*

U.S. Cl. 267—108 **5 Claims**

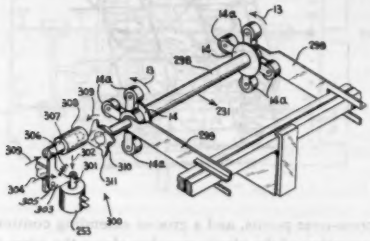


1. In a torsion spring assembly, a torsion spring formed of spring wire having a pair of U-shaped members angularly disposed relative to each other and integrally joined at their inner ends by looped portions and means mounting a plurality of said U-shaped members in longitudinally spaced relation onto a support comprising an elongate strip, a lengthwise extending bore within said strip having a cross section dimensioned to receive the bail portion of said U-shaped members, a slot extending from the upper surface of the strip to the bore with the portion of the slot adjacent the bore having a width less than the cross section of the wire of the bail portion whereby the bail portion can be inserted through the slot into the bore and is retained within said bore when in the assembled relation, spaced pairs of cutouts extending crosswise through the bore and the cutout in each pair being spaced longitudinally by an amount corresponding to the spaced relation between the arms of the U-shaped member whereby the arms are crosswise aligned with said cutout portions when the bail portion is in position of assembly within the bore, and means for securing the strip to a support.

4,003,565
DISENGAGING APPARATUS FOR A COLLATOR

Robert E. Mersereau, Stamford, and Michael A. Brown, Norwalk, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Oct. 20, 1975, Ser. No. 623,609
Int. Cl.² B65H 29/045
U.S. Cl. 270—58 10 Claims



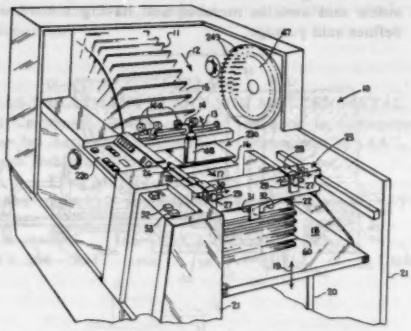
1. A rotary drum collator, comprising:
a rotatable drum having a plurality of pockets for storing quantities of sheet material to be collated into stacks, said pockets being angularly arranged about the drum;
a rotatable spider mechanism disposed adjacent said drum for rotating in synchronism with the drum to remove the sheet material from the pockets of said drum, said spider mechanism being movable from a first sheet removing position to a second non-removing sheet position;
disengaging means disposed adjacent said spider mechanism for movably engaging with said spider mechanism for causing said spider mechanism to move from said first sheet removing position to said second non-removing sheet position with respect to said drum; and
sensing means disposed adjacent said drum for sensing a sheet feeding malfunction, said sensing means being coupled to said disengaging means for causing said disengaging means to move into engaging contact with said rotating spider mechanism for moving said spider mechanism from said first sheet removing position to said second non-removing sheet position in response to the sensing of a sheet feeding malfunction.

4,003,566
ROTARY COLLATOR SYSTEM HAVING A CYCLE/STOP OPERATIONAL MODE

Michael A. Brown, Norwalk, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Oct. 20, 1975, Ser. No. 623,625
Int. Cl.² B65H 39/045
U.S. Cl. 270—58 6 Claims

1. A rotary drum collator system for operating in a cycle stop mode, comprisng:
a rotatable drum having a plurality of pockets for storing quantities of sheet material to be collated into stacks, said pockets being angularly arranged about the drum;
rotatable withdrawing means disposed adjacent said drum for removing the sheet material from the pockets of said drum;
sensing means operatively disposed adjacent said drum for detecting a sheet feeding malfunction; and
cycling means operatively connected to said drum for cyclically rotating said drum through at least one complete revolution during normal operation, and through a partial revolution when a sheet feeding malfunction is detected, said sensing means being operatively coupled to said cycling means for actuating said cycling means to continue to rotate said drum in a controlled manner through a partial revolution and then stop the drum in response to the detection of a sheet feeding malfunction, said cycling means including rotation control means for providing a controlled amount of drum rotation required for a partial revolution of said drum, said cycling means preventing said withdrawing means from removing sheet material

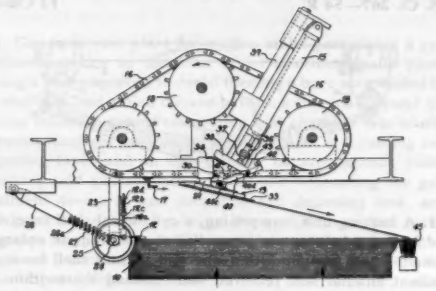


from said pockets during said controlled partial revolution of said drum, whereby a pocket of said drum adjacent the withdrawing means at the time said malfunction occured will be rotated to an accessible position for inspection and otherwise correction of said malfunction.

4,003,567
SHEET PICK-UP AND FEEDER

Emil J. Berger, Jr., Hatfield, Pa., and John M. Mitchard, Cherry Hill, N.J., assignors to Union Camp Corporation, Wayne, N.J.

Filed Apr. 7, 1976, Ser. No. 674,591
Int. Cl.² B65H 3/08
U.S. Cl. 271—12 6 Claims



1. Apparatus for picking up a single sheet of semi-rigid material from the top of a stack of such sheets and transporting the sheet in a forward direction away from the stack comprising:
a support for the stack of sheets having lifting means;
hold-down means to maintain a downward force against the top of the stack at the back edge of the stack;
a pick-up shoe having a seal around the outer periphery of the shoe to maintain a vacuum within the seal;
the said shoe being positioned and adapted under vacuum to pick up the back end of the top sheet of the stack;
means for applying a vacuum through the said shoe;
raising and lowering means for the said shoe;
linkage between the said raising and lowering means and the said shoe, the said linkage, when the vacuum means and raising means are activated, imparting an initial sliding movement of the shoe and top sheet along the top of the stack to release the said top sheet from the hold-down means and then raising the back edge of the top sheet;
flexible projections along the front edge of the stack to

prevent forward motion of the subsequent sheets in the stack; and

means moving forward above the stack to engage the raised back edge of the said top sheet;

whereby the said top sheet will be transported away from the said stack.

4,003,568

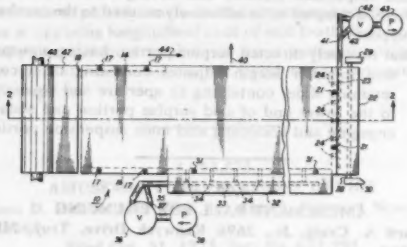
FLUID CONVEYER

Klaus K. Stange, Pittsford; Richard E. Smith, Webster; Thomas J. Hamlin, Macedon, and James R. Cassano, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 8, 1975, Ser. No. 638,589

Int. Cl.² B65H *5/00*

U.S. Cl. 271—225 **11 Claims**



1. Apparatus for transporting and cooling toner bearing sheets discharged from a fuser, comprising:

a. a structure having a pair of superposed sheet passageways, the entrance to the passageways being located at one end of the structure;

b. means for alternately feeding successive sheets from the fuser into said passageways; and,

c. fluidic means for moving fed sheets toward the other end of the structure and thereafter in a transverse direction out of the structure.

4,003,569

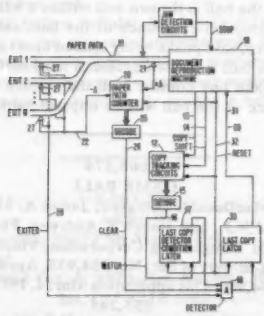
LAST COPY DETECTION

Donald Richard Andrews, and Ralph Joseph Leclere, both of Boulder County, Ohio, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 28, 1975, Ser. No. 636,251

Int. Cl.² B65H *7/02*

U.S. Cl. 271—259 **15 Claims**



1. The method of indicating a last one of a successive train of articles being transported along a path from a receiving portion to a given exit location from a given entrance location, the steps of:

indicating a desired article transport status signifying approaching an end of a train of articles;

indicating that a predetermined portion including said receiving portion but excluding said exit location of said path is clear of said articles;

detecting and indicating that an article has exited from said path at said given exit location; and

combining all of said indications to signify a last one article has exited said path.

4,003,570

CONVEYOR FOR TRANSFER SHEET FIXING APPARATUS

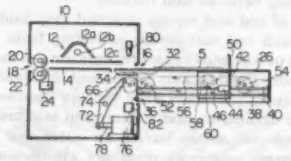
Masanori Yamanaka, Tokyo, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed July 14, 1975, Ser. No. 595,987

Claims priority, application Japan, July 19, 1974, 49-82941

Int. Cl.² B65H *7/02*

U.S. Cl. 271—265 **13 Claims**



1. In a transfer sheet fixing apparatus having a housing provided with an inlet opening, the combination therewith of a transfer sheet conveyor comprising;

a table mounted adjacent to the inlet opening and having a longitudinal slot formed therethrough longitudinally aligned with the inlet opening;

a pusher member extending through the slot; and

drive means including a belt and pulley assembly supported by the table for reciprocally moving the pusher member, the belt and pulley assembly comprising an endless belt arranged parallel to the slot and connected to the pusher member, two pulleys training the belt therearound and having the same radius, a first gear fixed for rotation with one of the pulleys, and a second gear rotatably supported by the housing and meshing with the first gear.

4,003,571

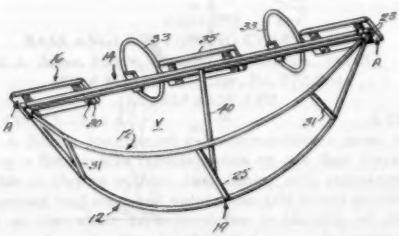
ROCKING DEVICE

William U. Nipper, Jr., Swainsboro, Ga., assignor to Karrh & Malone, Swainsboro, Ga.

Filed Mar. 15, 1976, Ser. No. 667,192

Int. Cl.² A63G *11/00*

U.S. Cl. 272—56 **2 Claims**



1. A rocking device comprising

a. a pair of metal rod rockers, each rocker having a pair of free ends, and each rocker being curved between the free ends thereof;

b. means for attaching said free ends of said rockers to each other so that the rockers abut at the free ends thereof to provide free ends sets, but so that they are widely spaced from each other at middle portions thereof remote from said free ends thereof, said attaching means including a metal rod support member extending between said rockers at the middle, most widely spaced, portions thereof and attached to said rockers,

c. a pair of metal rod cross members extending between the end sets of said rockers and connected to said rockers, said metal rod cross members in abutting engagement substantially along the entire length thereof, and said cross members and said rockers defining an interior volume of said rocking device, said cross members having free ends thereof extending past the point of connection of the rocker end sets with said cross members, said free ends providing stops for limiting the angle through which the rocking device may rock by abutting the surface on which said rocking device is rocking, and a metal rod support member extending downwardly from a middle portion of said cross members to said support member extending between said rockers,

d. a pair of end seat means attached atop said cross members, each end seat means extending from substantially one set of free ends of said rockers toward the other set of free ends of said rockers so that an individual sitting on an end seat will normally have his feet disposed within the volume defined by said rockers and said cross members, said end seat means having an outer end area thereof overlapping said cross members a sufficient amount to allow an individual to place his fingers underneath said seat means and grasp said seat means, but not of sufficient overlapping amount so that an individual's fingers will be pinched between said seat means and the surface on which said rocking device is rocking, said cross members ends always abutting said surface before the outer ends of said end seat means, and stopping further movement of said end seat means toward said surface,

e. a middle seat disposed between said end seats and attached to said cross members, and

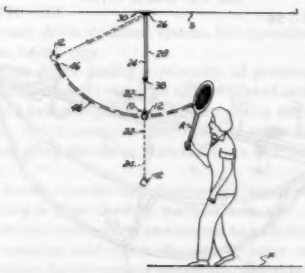
f. feet rest means extending between said rockers at positions wherein an individual sitting on an end seat may readily place his feet thereon with his toes generally disposed within the volume defined by said rockers and said cross members.

4,003,572

HOME TENNIS PRACTICE CONTRIVANCE

Louis A. Harvey, 15107 Ilene, Detroit, Mich. 48238

Filed Apr. 28, 1975, Ser. No. 572,621
Int. Cl.² A63B *61/00*
U.S. Cl. 273—29 A **1 Claim**



1. A home-tennis practice contrivance comprising

an elongated flexible substantially inextensible filamentary suspension member having a main suspension portion with a pivot portion at its upper end adapted to be connected to an overhead support and having a reversely-directed surplus portion depending from said pivot portion,

an inflatable and deflatable toy-balloon-like bag of elastomeric material having a tubular inflation neck portion projecting upward therefrom and adapted to be constricted in air-retaining relationship to said bag and connected to the lower end of said main suspension portion of said suspension member,

said bag when inflated being of spheroidal shape and of substantially the size of a conventional tennis ball,

said bag when deflated being of limply-drooping vertically-elongated shape,

said bag in response to impact with a tennis racquet travelling upon a forward flight at relatively high speed and upon a return flight at a greatly retarded speed in response to the decelerating effect of air resistance upon the bag. ;

and an attachment device connected to said pivot portion of said suspension member and having an adhesive layer thereon adapted to be adhesively secured to the overhead support,

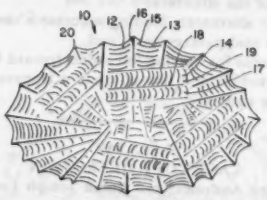
said reversely-directed surplus portion having a suspension member length adjuster consisting of a cord-retaining slider containing an aperture and connected to the lower end of said surplus portion and slidably engaging and encircling said main suspension portion.

4,003,573

AMUSEMENT BALL FOR BOUNCING

Edward A. Craig, Jr., 2696 Kenwyck Drive, Troy, Mich. 48084

Filed Jan. 2, 1976, Ser. No. 645,959
Int. Cl.² A63B *37/12*, *43/00*
U.S. Cl. 273—58 K **2 Claims**



1. A ball fabricated of an elastomeric material for the purpose of throwing for bouncing, the surface of said ball being entirely covered with a plurality of elongated ridges and grooves which extend in a multiplicity of different directions, the peak of each ridge defining a line of substantial length which, when the ball is thrown and strikes a hard surface, will dictate the direction of bounce of the ball, said peaks being relatively sharp, said peaks being spaced apart a distance such that when the ball is thrown against a hard surface one of the ridges will make line contact with the surface and the direction of bounce of the ball will be unpredictable.

4,003,574

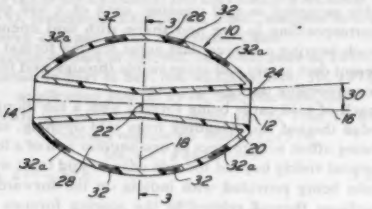
GAME BALL

Richard A. MacDonald, Delhaven; James A. MacDonald, Villas, both of N.J., and Joseph J. Andrews, Philadelphia, Pa., assignors to Thingamajig Corporation, Vineland, N.J.

Continuation-in-part of Ser. No. 354,935, April 27, 1973, Pat. No. 3,884,466. This application Mar. 4, 1975, Ser. No. 555,245
The portion of the term of this patent subsequent to May 20, 1992, has been disclaimed.
Int. Cl.² A63B *41/00*
U.S. Cl. 273—65 EC **10 Claims**

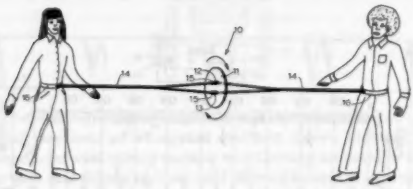
1. A football adapted to be manually thrown through the

air, having an oblate spheroid contour being substantially symmetrical about a major and a minor axis of said oblate spheroid contour, said football having a through nozzle passage formed about said major axis, said through nozzle passage being symmetrical in cross-sectional area about said



minor axis to provide maximum cross-sectional nozzle passage area at opposing longitudinal ends of said football and continuously decreasing to a minimum cross-sectional nozzle passage area at substantially a mid-point region between said opposing ends.

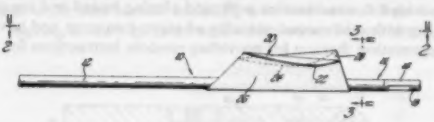
4,003,575
AMUSEMENT AND EXERCISE DEVICE
James D. Hobbs, 1337 79th St., Apt. 2, Newport News, Va. 23605
Filed Oct. 31, 1975, Ser. No. 627,795
Int. Cl.² A63B 71/02
U.S. Cl. 273—95 A **1 Claim**



1. An amusement and exercise device comprising:
a. a relatively thin, circular disc member having two apertures annularly disposed and circumferentially equally spaced about the center of said disc;
b. a cord member having a pair of opposed strands forming a closed loop and centrally mounting said disc member with each said strand passing through a respective one of said apertures; and
c. a pair of hollow tubular hand grip members slidably mounted on the respective remote ends of said strands enabling respective outer end loop portions to be formed for selective securement around body portions of the user of the device or alternatively around a belt worn by the user.

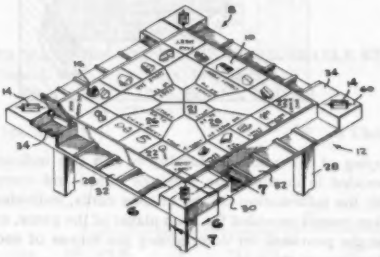
4,003,576
ARROW
Richard F. Carella, 35572 Strathcona Drive, Mount Clemens, Mich. 48043
Filed Oct. 1, 1973, Ser. No. 402,303
Int. Cl.² F41B 5/02
U.S. Cl. 273—106.5 C **24 Claims**

1. An arrow comprising a shaft with a forward end and rearward end, vane means extending along said shaft adjacent said rearward end, said vane means including first and second vanes spaced from said shaft and on the same side of said shaft, said first vane being disposed to angle downwardly from front to rear relative to said shaft and said second vane being disposed to angle upwardly from front to rear relative to said



shaft, said vanes being substantially coextensive with one another longitudinally of said shaft.

4,003,577
GAME APPARATUS
Joseph P. Bolach, 1596 Sanford, Muskegon, Mich. 49441
Filed Feb. 21, 1975, Ser. No. 551,844
Int. Cl.² A63F 3/00
U.S. Cl. 273—134 C **5 Claims**

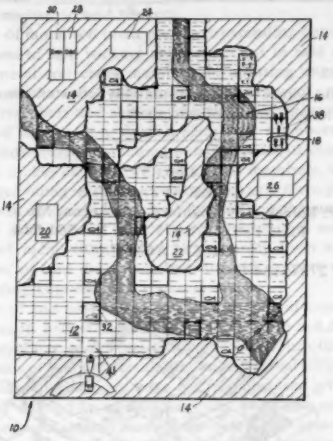


2. A game apparatus comprising a game board having a plurality of sequentially arranged stations constituting a playing path around the periphery of the game board with each of said stations identified by a different particular category of good, a plurality of player starting positions in the center of the game board, and directive stations intermediate each start position and at least one of the sequentially arranged stations, a plurality of position markers for movement by the players along the playing path, said directive stations causing a player to move to a particular station on the periphery of the game board when a position marker lands on a directive station, a plurality of game cards each identifiable with the indicia corresponding to one of said categories of goods on said stations on the playing path, a chance device which may be utilized by a player to determine the number of moves to make in a particular turn and an open storage compartment adjacent each sequentially arranged station around the periphery of the game board to hold the game cards whereby the player first collecting a card for each station wins the game.

4,003,578
BASS ANGLERS FISHING CLASSIC GAME
Mark A. Jones, 823 N. Winston, Tulsa, Okla. 74115
Filed May 2, 1975, Ser. No. 573,964
Int. Cl.² A63F 3/00
U.S. Cl. 273—134 AC **5 Claims**

1. A fishing tournament game comprising a game board having a fishing area representation on one face thereof to provide a playing surface, said fishing area representation comprising land areas and water areas, grid means provided at least on the water areas to define a plurality of playing squares, a first plurality of said playing squares being provided with instructions indicating a given size fish by weight and for loosely receiving a token of the same thereon, each of said fish tokens being of a size to fit with one of said first playing squares and being sufficient in number to fill all of the first playing squares at the start of the game, a second plurality of

said playing squares being provided with indicia relating to a selection of chance conditions, a plurality of chance cards provided in combination with said playing board and cooperating with said second plurality of playing squares and having information thereon for providing random instructions for the



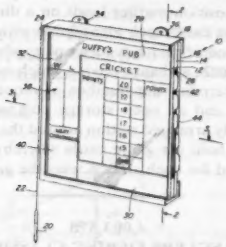
playing of the game, a plurality of fish size indication cards provided in combination with the board and corresponding with the information on the chance cards, individual playing token means provided for each player of the game, and at least one die provided for determining the moves of each playing token across the grid.

4,003,579

DART GAME SCOREBOARD

Raymond R. Miscavage, Somerville, Mass., assignor to John T. McDonnell, Somerville, Mass., a part interest

Filed July 7, 1975, Ser. No. 593,266
Int. Cl.² F41J *3/02*
U.S. Cl. 273—148 R **4 Claims**



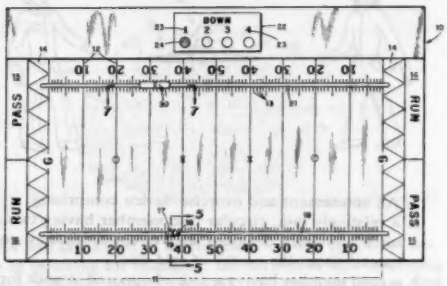
1. A scoreboard for dart games or the like, comprising,
a. a rectangular front wall of hard transparent material and substantially constant thickness providing a writing surface on the outer face thereof,
b. a C-shaped core of substantially constant thickness mounted to the inner face of said front wall in superimposed relation thereto, the dimensions of said core generally corresponding with those of said front wall,
c. said core being formed with a rectangular reentrant open area along one side edge thereof and bearing on the front face thereof permanent dart scoring indicia visible through said front wall and an area for temporarily recording dart game results,
d. a rectangular rear wall of substantially constant thickness coextensive with said front wall and mounted to the rear face of said core,
e. means connecting said front wall, said core and said rear wall to form a board having an opening in one side edge thereof, and,
f. a plurality of reprinted rectangular scoring cards removably mounted in said opening, each of a size generally corresponding in size and shape with said opening and each bearing a unique dart game scoring format for different dart games and areas visible through said front wall for recording dart game scores,
g. each of said cards being formed with a tab along a side edge thereof for extending from said opening, said tabs being offset with respect to one another and of a length to extend visibly beyond the side edge of said front wall, said tabs being provided with indicia on the forward facing surfaces thereof related to the scoring formats on the associated cards.

4,003,580

FOOTBALL GAME

John M. Haffey, Jr., 101 Oklahoma Ave., Oak Ridge, Tenn. 37830

Filed Sept. 17, 1975, Ser. No. 614,187
Int. Cl.² A63F *3/00*
U.S. Cl. 273—134 CF **16 Claims**



1. A simulated football game comprising:
a. a simulated football playing field including yard line and play selection indicia,
b. means for an offensive and a defensive player to indicate his choice of a play,
c. means for achieving secrecy in play selection by said offensive player,
d. means for representing the position of a ball on the simulated playing field,
e. means for indicating the yard line on the simulated playing field which must be achieved in order to accomplish a first down,
f. down indicating means,
g. a multiplicity of offensive play designation down cards having a plurality of play situations disposed thereon, and

h. a multiplicity of kick cards having a plurality of kicking situations disposed thereon.

4,003,581

FIELD DRESSABLE INFLATABLE PACKER

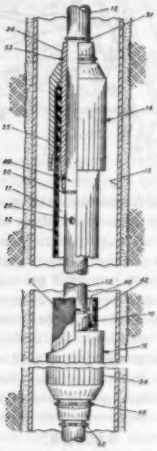
Stanley O. Hutchison, Bakersfield, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 367,602, June 6, 1973, and a continuation-in-part of Ser. No. 423,593, Dec. 10, 1973. This application Jan. 2, 1974, Ser. No. 430,326

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² F16J 15/46

U.S. Cl. 277—34.6 **3 Claims**



1. A field dressable inflatable packer comprising an inner tubing section, an elongated resilient sleeve element positioned over said tubing section and forming an annular chamber with said tubing section, said sleeve element comprising an elongated cured rubber tube having incorporated by curing therein at least one circumferential layer formed of from 20 to 40 per inch spaced apart stretchable nylon cord members having a diameter between about 0.002 and 0.005 of an inch and extending only longitudinally over the entire length of said rubber tube and in substantially parallel relationship with the longitudinal axis of said rubber tube and further characterized by the absence of any such cord member in said rubber tube transverse to said longitudinal axis of said rubber tube, clamp means slideably positioned on said tubing section connecting the ends of said sleeve element in fluidtight relationship with said tubing section, removable constraining means for constraining said clamp means in a predeterminable position on said tubing section and port means in said tubing section for injecting fluid into said annular chamber for inflating said sleeve element.

4,003,582

SKATE BOARD WHEEL BRAKE ASSEMBLY

Jeffrey A. Maurer, 3100 Cavendish Drive, Los Angeles, Calif. 90064

Filed Nov. 13, 1975, Ser. No. 631,713

Int. Cl.³ A63C 17/14

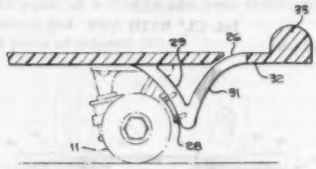
U.S. Cl. 280—11.2 **3 Claims**

1. A skate board wheel brake assembly for providing a braking force to the rear wheels of a skate board comprising:

a resilient brake arm molded to be integral with said skate board, said brake arm including a first portion formed to be in close proximity to said rear wheels of said skate board,

brake shoe means mounted on said first portion of said resilient brake arm adjacent said rear wheels, and

said brake arm further including a second extended portion having brake depressor means formed at the end thereof,



whereby the depression of said brake depressor means urges said first portion toward said rear wheels to thereby urge said brake shoe means into contact with said rear wheels to thereby provide braking force to said rear wheels.

4,003,583

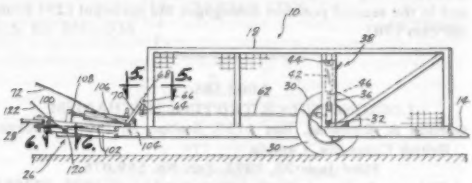
TRAILER HAVING A VERTICALLY ADJUSTABLE BED

Ned L. Stanzel, R.R. 3, Sac City, Iowa 50582

Filed Aug. 18, 1975, Ser. No. 605,340

Int. Cl.² B62D 61/12

U.S. Cl. 280—43.22 **6 Claims**



1. A trailer having a vertically adjustable bed comprising,

a bed having forward and rearward ends and having a frame and a forwardly extending tongue connected to said frame,

ground-engaging wheels disposed on opposite sides of said bed rearwardly of the forward end thereof, and said wheels each having transversly inwardly extending axles,

a pair of upstanding posts, one on each opposite side of said bed connected to said frame, said posts including side walls defining a hollow enclosure and one of said side walls including an elongated slot through which said axles extend, each of said axles including a block integrally secured thereto and positioned in said enclosure and said block having a configuration for matingly engaging the side walls of said enclosure to prevent all lateral movement of said block in said enclosure,

a locking pin is horizontally movably carried on each of said posts for selectively engaging said block to lock said axle to said post,

an actuating means extending to the front of said bed from said locking pins and said pins being spring loaded to a normal locked position,

a vertically positioned hydraulic cylinder positioned in and connected to each post and extending downwardly into engagement with said adjacent blocks,

control means for extending and contracting said cylinders for raising and lowering the rear end of said bed relative to the ground, and

power means operatively connected to said bed at the forward end thereof for raising and lowering the forward end thereof such that said bed may be raised and lowered to positions parallel to the ground.

4,003,584

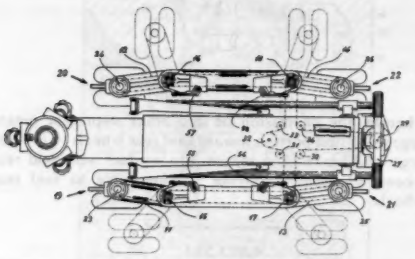
DOLLY WITH ARTICULATED AND STEERABLE WHEELS

Sante Zelli, Via della Pace 24, Rome, Italy

Continuation-in-part of Ser. No. 502,764, Sept. 3, 1974, Pat. No. 3,915,429. This application Aug. 14, 1975, Ser. No. 604,628

Int. Cl.² B62D 7/06

U.S. Cl. 280—91 **13 Claims**



13. Trolley with articulated and steerable wheels according to claim 10, characterised by the fact that the said joint which may be disconnected between the said cam (70) and the said first sprocket (29) is controlled by a lever (72) having two positions; this lever in one position engages the connection thus rendering the sprocket (29) integral with the cam (70), and in the second position disengages the sprocket (29) from the cam (70).

4,003,585

LOGGING TRUCK TRIPPING MECHANISM

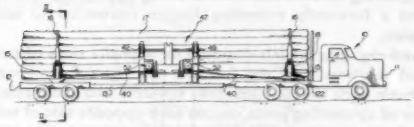
Gordon B. Richards, Box 1750, Station A, Prince George, British Columbia, Canada

Filed June 23, 1975, Ser. No. 589,076

Claims priority, application Canada, Apr. 7, 1975, 223981

Int. Cl.² B62D 63/08

U.S. Cl. 280—145 **15 Claims**



1. A device for pulling a trip cable in order to trip a lever, said device comprising spool means for storing said cable in a wound condition, means for winding said cable on said spool means, means for temporarily gripping said cable when one end of said cable is connected to said lever and said cable is being pulled to trip said lever, means for pulling said cable with said gripping means a distance sufficient to trip said lever and disconnect said one end of said cable from said lever, wherein said winding means winds said cable onto said spool means when said one end is disconnected from said lever.

4,003,586

SWAY RESISTING STRUCTURE FOR TRAILERS

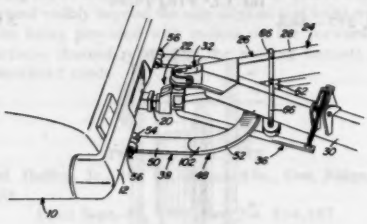
Jack R. Luck, Mentor, Ohio, assignor to Mentor Products, Inc., Mentor, Ohio

Filed Nov. 21, 1975, Ser. No. 634,268

Int. Cl.² B60D 1/16

U.S. Cl. 280—446 B **6 Claims**

1. In combination with a towing vehicle and a trailer coupled to said vehicle for trailing therebehind and angular displacement relative to said vehicle about an upstanding axis, first generally horizontally disposed friction surface structure supported from said vehicle and extending rearwardly of said axis, second friction surface structure supported from said trailer rearwardly of said axis and frictionally engaged with said first friction surface structure frictionally resisting angular displacement of said trailer relative to said vehicle about said axis, said first friction surface structure including a rear portion generally semicircular in plan shape and positioned with its center of curvature generally coinciding with said upstanding axis, said first friction surface structure comprising a horizontally disposed forwardly opening U-shaped frame, the free ends of said frame being attached to said vehicle and the



closed rear end of said frame comprising said rear portion and being of substantially constant radius of curvature with its center of curvature at least generally coinciding with said upstanding axis, said second friction surface structure comprising a clamp assembly mounted on said trailer and including relatively adjustable upper and lower downwardly and upwardly facing friction surfaces between which said closed end of said frame is received, the ends of said frame being pivotally supported from the rear of said vehicle for oscillation about aligned horizontal transverse axes, said aligned axes being spaced slightly forward of said upstanding axis.

4,003,587

SAFETY BINDING FOR SKI BOOTS

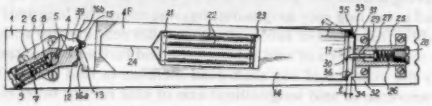
Georges Pierre Joseph Salomon, Annecy, France, assignor to Etablissements Francois Salomon et Fils, Annecy, France

Filed July 3, 1975, Ser. No. 593,056

Claims priority, application France, July 3, 1974, 74.23190

Int. Cl.² A63C 9/081

U.S. Cl. 280—637 **25 Claims**

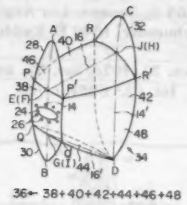


1. In combination, a ski and a safety binding device for a ski boot, said device comprising: a ski boot element; a first mobile holding element mounted on said ski for retaining one end of said ski boot element said first holding element being laterally pivotable; a second holding element for retaining the other end of said ski boot element; connecting means permanently attaching said ski boot element to said ski, through said first holding element, whereby, when the safety binding device releases, although said ski boot element may move away from the ski, it will still remain attached thereto; said connecting means including resilient means; said ski boot element and said first holding element each including contacting cooperating profile means, said profile means being adapted to increase the tension of said resilient means of said connecting means when said first holding element moves laterally under the action of said ski boot element whereby said ski boot element is returned in alignment with said first holding element when the lateral load is insufficient to release the binding device.

4,003,588
INFLATABLE PROTECTOR BAG OR VEHICLE SAFETY DEVICE

Takashi Oka, Tokyo; Syuichi Suzuki; Hilokazu Mitsuhashi, both of Yokohama, and Hiroshi Iwasaki, Kamakura, all of Japan, assignors to Nissan Motor Co., Ltd. and Ikeda Bussan Company, Limited, both of Japan

Filed June 26, 1975, Ser. No. 590,496
Claims priority, application Japan, July 2, 1974, 49-75563
Int. Cl.² B60R *21/08*
U.S. Cl. 280—743 6 Claims



1. An inflatable protector bag of a vehicle safety device for protecting a vehicle occupant during a collision of the vehicle, formed of a yielding and gas-impermeable material and having a collapsed inoperative condition and an expanded and unloaded operative condition having, when unloaded, a generally hexahedral configuration which consists of a first rectangular sheet section having first and second pairs of parallel sides, a second rectangular sheet section substantially normal to said first rectangular sheet section and having first and second pairs of parallel sides, one of the first pair of parallel sides of the second rectangular sheet section being common to one side of the first of parallel sides of said first rectangular sheet sections, a first substantially isosceles triangular sheet section opposite to said first rectangular sheet section and having a base common to the other side of said first pair of parallel sides of said second rectangular sheet section and substantially equilateral sides meeting at a vertex, a second substantially isosceles triangular sheet section opposite to said second rectangular sheet section and having a base common to the other side of said first pair of parallel sides of said first rectangular sheet section and substantially equilateral sides meeting each other at said vertex, and first and second substantially congruent, scalene quadrilateral sheet sections which are opposite to each other and which have respective first sides common to said second pair of parallel sides of said firt rectangular sheet section, respective second sides common to said second pair of parallel sides of said second rectangular sheet section, respective third sides common to said equilateral sides of said first triangular sheet section and meeting each other at said vertex, and respective fourth sides common to said equilateral sides of said second triangular sheet section and meeting each other at said vertex.

4,003,589
CARBONLESS COPYING PAPER

Akio Konishi, Machida; Masaaki Takahashi; Fumihiro Kimura, both of Tokyo, and Takehisa Toguchi, Akishima, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 160,533, July 7, 1971, Pat. No. 3,806,463. This application Oct. 4, 1973, Ser. No. 403,513
Claims priority, application Japan, July 11, 1970, 45-60473; Sept. 2, 1970, 45-76524; Sept. 2, 1970, 45-76525; Apr. 20, 1971, 46-24938; Apr. 20, 1971, 46-24939; Apr. 20, 1971, 46-29440; Apr. 20, 1971, 46-24941; Apr. 20, 1971, 46-24942; Apr. 20, 1971, 46-24943; Apr. 20, 1971, 46-24944
Int. Cl.² B41L *1/36*
U.S. Cl. 282—27.5 3 Claims

1. In a carbonless copying paper comprising paper coated with microcapsules containing a dye solution which is composed of a solvent, a dye and a mineral oil, the improvement comprising a dye solution including:

a. 100 parts of solvent comprising one or more alkyl naphthalenes selected from the group consisting of methyl propyl naphthalene, dimethyl propyl naphthalene and dipropyl naphthalene;

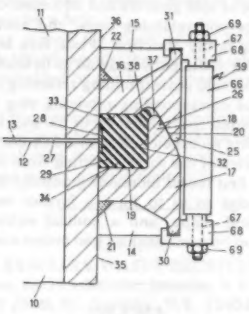
b. 0.5–15 parts of a dye which gives color under acidic conditions; and

c. 0–100 parts of mineral oil.

4,003,590
FLUID-TIGHT FLANGE COUPLING AND METHOD OF MAKING THE SAME

Walter Hefel, In der Halde, Berlingen (Thurgau), Switzerland

Filed Nov. 22, 1974, Ser. No. 526,368
Claims priority, application Switzerland, Nov. 23, 1973, 16516/73
Int. Cl.² F16L *17/06*
U.S. Cl. 285—336 10 Claims

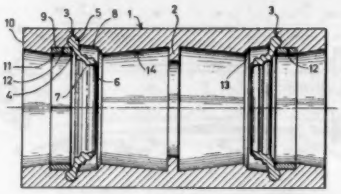


1. A sealed joint, comprising a pair of tubular hollow elements having adjacent open ends which together define a gap; a pair of annular flanges applied about the outer surfaces of said tubular hollow elements, each of said flanges being formed from a profiled strand whereby each of said flanges is bent about the outer surface of a different one of said tubular hollow elements, said one flange being shaped so as to conform to the contour of the outer surface of the respective tubular hollow element and said flanges having abutting contact surfaces, at least one of said flanges being provided with an annular recess which, together with the other flange and the outer surfaces of said ends of said tubular hollow elements, defines an annular space in the region of said open ends which extends across said gap; a compressible sealing element in said annular space positioned outwardly of and extending across said gap and covering said ends of said tubular hollow elements, said sealing element being in compression due to the proximity of said flanges to one another, and said sealing element abutting the outer surfaces of said tubular hollow elements and exerting pressure on the same and at said gap from outwardly thereof to thereby prevent the passage of fluid through said gap; and means for disengaging and engaging said flanges.

4,003,591
PLASTIC SOCKET MADE OF FIBRE REINFORCED THERMOSETTING RESIN MATERIAL

Gerrit Schuldink, Ommen, Netherlands, assignor to Industriele Onderneming Wavin N.V., Netherlands

Filed Dec. 8, 1972, Ser. No. 313,280
Claims priority, application Netherlands, Dec. 14, 1971, 7117092
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 6, 1976
Int. Cl.² F16L *17/02*
U.S. Cl. 285—110 8 Claims

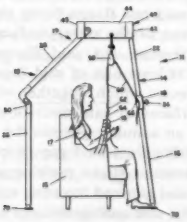


1. A socket of fibre reinforced thermosetting resin comprising: at least one inner push edge; annular grooves each situated in the vicinity of a respective free end of the socket for receiving sealing means; first recesses each opening into a respective one of said grooves and extending in the direction of said push edge, the inner diameter of said first recess being greater than the smallest inner diameter of said free end of the socket; two retaining rings; second recesses each opening into a respective one of said grooves and accommodating a corresponding one of said retaining rings, and each said second recess extending in the direction of said free end and having an inner diameter sufficiently large so as to accommodate the inner diameter of said corresponding retaining ring, the inner diameter of said corresponding retaining ring being at least equal to the smallest inner diameter of the socket adjacent the end of said second recess closest to said free end of the socket; the inner diameter of the socket starting from a position near the end of said first recess increases gradually in the direction of said push edge so as to form a further recess having a truncated conical shape; and a conical entrance provided within the socket between said second recess and said free end of the socket.

4,003,592
MACRAME ASSEMBLY HOLDER

Dave W. Schreves, 2145 Emerald, NE., Grand Rapids, Mich. 49505

Filed Feb. 17, 1976, Ser. No. 658,294
Int. Cl.² B65H *69/04*
U.S. Cl. 289—18 10 Claims



1. A macrame assembly holder for hanging a macrame assembly at a variety of adjustable vertical positions while a person works on the macrame, said macrame assembly holder comprising:

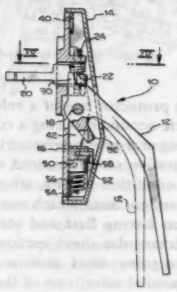
a frame including a plurality of upwardly extending legs that are interconnected at upper portions thereof, the frame being sufficiently high to permit a person to sit under the frame; and

suspension means for hanging the macrame assembly from the frame, said suspension means being adjustable to vary the vertical position of the macrame assembly with respect to the frame.

4,003,593
PUSH DOOR-LATCH OPENER

Herbert Wilzig, 1809 S. Stearns, Los Angeles, Calif. 90035, and Charles J. Schuessler, 1340 E. Ruddock, Covina, Calif. 91722

Filed Feb. 23, 1976, Ser. No. 660,245
Int. Cl.² E05F *15/20*
U.S. Cl. 292—92 2 Claims



1. A push door-latch opener having mounting means for attaching said door-latch opener to a door, comprising:

horizontal pivoting means attached to said mounting means;

vertical pivoting means attached to said mounting means, said vertical pivoting means being positioned above said horizontal pivoting means;

a horizontal bell crank pivoted about said vertical pivoting means, having a first arm projecting into the plane of the door and a second arm being substantially parallel to the plane of the door;

biasing means for biasing said bell crank in a direction so that the second arm is biased in the direction of the first arm;

a downwardly-directed push handle pivoted about said horizontal pivoting means, said push handle being biased to a first out position and being adapted to be pushed to a second in position; said push handle having above the horizontal pivoting means an upwardly-directed projection which engages the inner surface of the second arm of said bell crank so that when the push handle is pushed, the projection turns the second arm away from the door and simultaneously turns the first arm, thereby operating a latching mechanism, and said push handle further includes, below said horizontal pivoting means, a downwardly-directed, laterally-extending projection which is spaced from the mounting means when the push handle is in the out position;

a push handle blocking member;

a housing attached to said mounting means below said downwardly-directed projection, said housing containing said blocking member;

biasing means for biasing said blocking member upwardly; and

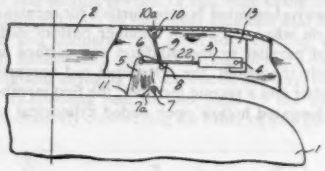
restraining means for restraining the upward movement of said blocking member and adapted to yield at a high temperature, thereby releasing said blocking member upwardly so as to engage the inner surface of said downwardly-directed projection and thereby prevent the inward movement of the push handle.

4,003,594

HYDRAULIC SHOCK ABSORBING BUMPER MOUNTING ARRANGEMENT

Nils Christian Tommeraas, Lunders vei 16, 2830 Raufoss, Norway

Filed Mar. 7, 1975, Ser. No. 556,386
Claims priority, application Norway, Mar. 7, 1974, 800/74
Int. Cl.[2] B60R *19/06, 21/14, 27/00;* B61F *19/04*
U.S. Cl. 293—84 9 Claims



1. A mounting assembly for connecting an end portion of a channel-shaped bumper member in limited spaced relation to a vehicle member and adapted for cushioning impacts against the bumper member, said assembly including a telescopic hydraulic shock absorber comprising a cylinder having one attachment end and a piston rod projecting from the opposite end, spring means associated with the shock absorber to restore the shock absorber to uncompressed initial position after compression thereof with the piston rod projecting beyond said opposite end, and wherein the improvements comprise:

a bracket on said vehicle member projecting toward said bumper member;

a bracket on said bumper member projecting toward said vehicle member;

at least portions of the brackets being in spaced general alignment opposite each other in generally the direction of the longitudinal axis of the member;

means pivotally connecting said one end of the shock absorber to one of said members in a fixed position in the space between said members and substantially spaced from said brackets;

said shock absorber in its uncompressed condition and in the neutral condition of the mounting assembly being disposed on an axis extending transversely and normal to the longitudinal axis of the vehicle member and with the extended end of the piston rod disposed in said space between the members and offset toward the bumper member from said bracket mounted on the vehicle member;

a main pivot element located in said space between the members and pivotally conneeted at one point thereof to one of said brackets;

means establishing a pivotal connection between said pivot element and the other said bracket at another point on said pivot element;

means pivotally connecting said extended end of said piston rod to a third point on said pivot element;

means associated with said pivot element to prevent pivotal movement thereof in one direction from neutral position;

said means pivotally connecting said piston rod to said pivot member being positioned to resist pivotal movement of the pivot element caused by impact on said bumper member and thereby to effect cushioning of the force of said impact by operation of said shock absorber;

and most of said assembly including at least a substantial portion of said pivot member and a substantial portion of said shock absorber being concealed in the channel of said bumper member whereby the overall length of the vehicle including the bumper member is adapted to be maintained within narrow limits.

9. A mounting assembly for connecting an end portion of a channel-shaped bumper member in limited spaced relation to a vehicle member and adapted for cushioning impacts against the bumper member, said assembly including a telescopic hydraulic shock absorber comprising a cylinder having one attachment end and a piston rod projecting from the opposite end, spring means associated with the shock absorber to restore the shock absorber to uncompressed initial position after compression thereof with the piston rod projecting beyond said opposite end, and wherein the improvements comprise:

means pivotally connecting one end of the shock absorber to one of said members;

said shock absorber being disposed transversely and normal to the longitudinal axis of the vehicle when in uncompressed condition;

separate brackets one of which is mounted on one of said members and the other of which is mounted on the other of said members;

a main pivot element pivotally connected at one point thereof to one of said brackets;

means establishing a pivotal connection between said pivot element and the other of said brackets at another point on said pivot element;

means pivotally connecting said extended end of piston rod to a third point on said pivot element;

means associated with said pivot element to prevvent pivotal movement thereof in one direction from neutral position;

said means pivotally connecting said piston rod to said pivot element being positioned to resist pivotal movement of the pivot element caused by impact on said bumper member and thereby to effect cushioning of the force of such impact by operation of said shock absorber;

the bracket on the vehicle being L-shaped and said main pivot element being connected to the shorter leg of the L-shaped bracket;

the longer leg of said L-shaped bracket being attached to the vehicle by a bolt;

and a spring around the shank of said bolt, whereby said bracket is tiltable against the action of said spring about a fulcrum provided by the bend connecting the legs of the bracket;

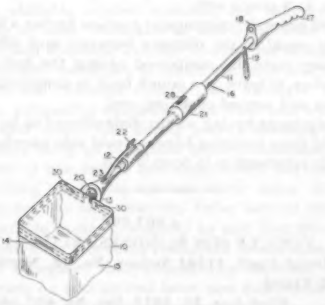
and most of the assembly being concealed in the channel of said bumper member whereby the overall length of the vehicle including the bumper member is adapted to be maintained within narrow limits.

4,003,595

SANITARY WASTE RECEIVER

Joseph D. Fano, 85-17 150th St., Jamaica, N.Y. 11435, and Fu Hwa, 82-78 167th St., Jamaica, N.Y. 11432

Filed Nov. 10, 1975, Ser. No. 630,171
Int. Cl.[2] A01K *29/00*
U.S. Cl. 294—19 R 6 Claims



1. A portable sanitation device comprising a foldable container having upper edges, a hollow rod, a serrated draw band engaging the edges of said container, a draw band locking

plate and means carried by said rod and connected with said draw band, said means being movable upon said rod and moving said draw band from a position in which it maintains the edges of said container open to a position in which it closes and locks said edges.

4,003,596

CAMPER KIT

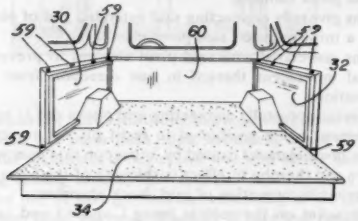
Robert H. Robertson, Dallas, Tex., assignor to Ronbil Industries, Inc., Mesquite, Tex.

Continuation of Ser. No. 377,316, July 9, 1973, abandoned, which is a continuation-in-part of Ser. No. 254,540, May 18, 1972, Pat. No. 3,751,103. This application Mar. 21, 1975, Ser. No. 560,327

The portion of the term of this patent subsequent to Aug. 7, 1990, has been disclaimed.

Int. Cl.² B60P *3/38*

U.S. Cl. 296—23 R **3 Claims**



1. An assembly for installation in a pickup having a camper cover comprising:

a floor covering dimensioned to fit the bottom of a pickup bed;

first and second elongated rigid side panels dimensioned to cover the interior sides of the pickup bed wherein each of said panels include an integral enclosure for receiving and covering the wheel well covers of the pickup bed, such that said side panels are independent relative to said floor covering;

means for attaching said side panels to the interior sides of the pickup bed adjacent the edges of said floor covering on the bottom of the pickup bed, such that the bottom edges of said panels exert a sufficient force on the marginal edges of said floor covering to hold said floor covering in place;

a plurality of cushions dimensioned for being selectively arranged on said floor covering as a couch and as a bed, said cushions including first and second generally rectangular cushions having lengths generally equal to the distance between said side panels for being disposed between said side panels and stacked one upon the other for use as a couch seat;

a third generally rectangular cushion having a length generally equal to the distance between said side panels for being vertically positioned against the bulkhead of the pickup to serve as a couch back in conjunction with said first and second cushions; and

said cushions having widths dimensioned to be disposed on said floor covering between said side panels in a side by side relationship to form a bed.

4,003,597

VEHICLE SUN BLINDNESS ELIMINATOR

Jerry Doyal Acuff, 11741 Saticoy, No. 18, North Hollywood, Calif. 91605

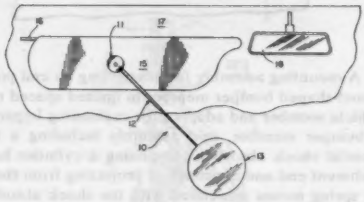
Filed Aug. 25, 1975, Ser. No. 607,668

Int. Cl.² B60J *3/00*

U.S. Cl. 296—97 C **1 Claim**

1. A vehicle sun blindness eliminator device comprising, in combination:

a swivel base adapted to be affixed to a conventional sun visor of a vehicle, a telescopic support rod having one end affixed to the swivel base with the rod extending radially outwardly therefrom, a flat circular disc manufactured of translucid or translucent material and affixed to the opposite end of the support rod, the swivel base consisting of a platform having a flat bottom surface and a flat top surface, a swivel member having a flat bottom surface and a curved exterior top surface, a shaft extending normal to the platform top surface and projecting outwardly from the central portion thereof, a socket defined centrally of said swivel member bottom surface for receiving the shaft therein when the swivel member bottom surface is disposed parallel to the platform top surface and spaced slightly therefrom, the telescopic rod comprising a first member and a second member, the first member being of an elongated hollow open ended cylindrical tube having



one end secured to the swivel member with the first member extending radially outwardly therefrom and terminating at a free end, and a second member being of a solid elongated cylindrical rod having one end telescopically received in the free end of the first member and having the opposite end extending outwardly therefrom and being affixed to the disc member with the second member extending radially outwardly relative to said disc member, said disc member having a flat circular configuration with a flat top surface, a flat bottom surface, and a circular peripheral edge surface, the back surface of the disc member being affixed at its periphery to the adjacent terminal end of the second member of the telescopic support rod; and

an even coating of pressure sensitive adhesive applied to the platform bottom surface for use in attaching said swivel base to the point of mounting on a conventional sun visor of a vehicle.

4,003,598

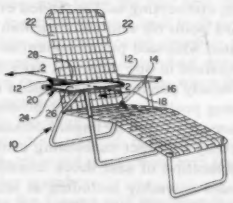
CHAIR MOUNTED TRAY

Thurman A. Glaze, Tampa, Fla., assignor to Grace M. Masiello, Largo, Fla., a part interest

Filed June 6, 1975, Ser. No. 584,280

Int. Cl.² A47C *7/62*

U.S. Cl. 297—194 **9 Claims**



1. An assembly for mounting a tray alongside a chair, or the like, comprising means for mounting the tray for free generally horizontal sliding movement to and fro along a side of the chair and for generally horizontal swinging movement between positions generally alongside the chair and generally in front of the chair, and said means comprising cooperating

parts including a track and a slide releasably interlocked for relative rotation and for relative sliding movement in the direction of the track, said track including a body having a groove defined by an inner face and a pair of opposed flanges spaced apart to define a gap therebetween, said pair of flanges being spaced outwardly from said inner face, said slide including a first generally cylindrical portion extending through said gap, and a second generally cylindrical portion larger than said first portion and said gap and received in said groove, when the slide and track are operatively assembled, and opposite faces of said second portion of said slide being in engagement with adjacent ones of said inner face and said flanges of said groove and cooperatively sized for retaining said tray substantially horizontally disposed during such generally horizontal sliding and swinging movement of the tray, means for operatively connecting one of said parts to the chair, and means for operatively connecting the other of said parts to the tray.

4,003,599

SAFETY HEAD-REST

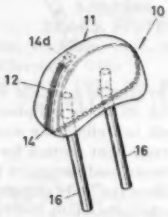
Ikuo Takamatsu, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 22, 1976, Ser. No. 651,438

Claims priority, application Japan, Jan. 27, 1975, 50-12741[U]

Int. Cl.² A61G 15/00

U.S. Cl. 297—220 **4 Claims**



1. In a safety head-rest having a filling core and a generally vertical, elongated support member supporting the filling core at its upper end, and wherein said head-rest is particularly adapted to engage and project vertically above an automobile or like seat;

a. a generally bag-shaped hollow body having two substantially identical portions split along the periphery of the body to define a peripheral opening therebetween, and an elongated connecting portion, along a minor portion of the periphery of the body, connecting said two split portions at their upper portions to interrupt said peripheral opening, one of said two split portions having an aperture formed through its lower portion in closely spaced relation to said peripheral opening for receiving the support member therethrough, said connecting portion serving as an axis of fold about which one of the split portions can be folded upon the other to facilitate insertion of the filling core into the body; and

b. a slide fastener having a slider, opposed stringers, and end stops, said opposed stringers being secured to the marginal edges along the complete length of said peripheral opening, said slider being movable along the said opposed stringers to close said peripheral opening.

4,003,600

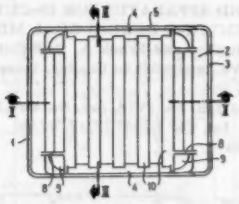
UPHOLSTERED FURNITURE

Dieter Horn, Backnanger Str. 40, D-7062 Rudersberg, Germany

Filed Oct. 1, 1975, Ser. No. 618,342

Int. Cl.² A47C 7/02

U.S. Cl. 297—454 **23 Claims**



1. A chair or couch with upholstery, which is in a supporting relationship with a spring base, comprising a rigid frame, whose surface is spanned by at least one spring element, with both the rigid frame and the spring element(s) comprising a foamed plastic, in which frame and spring elements are fabricated as one piece, of the same material, in one step in a mould.

4,003,601

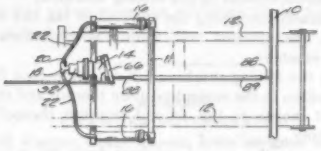
SAFETY APPARATUS FOR HYDRAULIC VALVES IN DUMP BODY MECHANISM

Ronald B. Gerding, New Berlin, Wis., assignor to The Heil Co., Milwaukee, Wis.

Filed Jan. 28, 1976, Ser. No. 653,171

Int. Cl.² B60P 1/28

U.S. Cl. 298—22 C **14 Claims**



1. In a dump body mechanism having a frame, having a tiltable dump body mounted thereon, and having means including a hydraulic cylinder for raising and lowering the body, there being a hydraulic circuit for said cylinder including a hydraulic pump and a return line, and there being a valve in said circuit for controlling the flow of hydraulic fluid into and out of said hydraulic cylinder, said valve including a valve body and a shiftable control member, and said hydraulic circuit having a "raise" condition in which hydraulic fluid is directed into said hydraulic cylinder to raise the dump body, having a "neutral" condition in which the hydraulic fluid is locked within said hydraulic cylinder, and having a "lower" condition for exhausting hydraulic fluid from said hydraulic cylinder to said return line during gravity lowering of the body, and there being an elongated force-transmitting member connected at one end to said dump body, the improvement comprising first and second lever arms pivotally mounted adjacent to said shiftable valve control member, manually operable means connected to said first lever arm, and said second lever arm being connected to said dump body through said elongated force-transmitting member, a first abutment means on said second lever arm positioned to engage said first lever arm after said second lever arm has been pivotally moved a predetermined distance to automatically switch said hydraulic circuit from its "raise" condition to its "neutral" condition after said dump body has reached its uppermost position, and second abutment means positioned

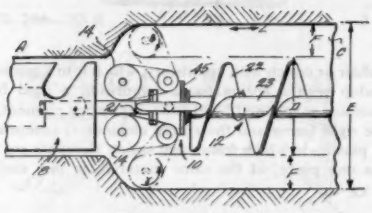
to limit further movement of said second lever arm whereby an inadvertent force on said elongated force-transmitting member will not cause unexpected lowering of the dump body, said second abutment means being positioned to avoid interference with the movement of said first lever arm in a dump body lowering direction.

4,003,602

METHOD AND APPARATUS FOR IN-CUTTING AND OUT-CUTTING DURING COAL MINING

James Conley Justice, and Frank A. Delli-Gatti, Jr., both of Beckley, W. Va., assignors to Coaltex, Incorporated, Beckley, W. Va.

Filed Jan. 16, 1976, Ser. No. 649,579
Int. Cl.² E21C *27/22, 41/00*
U.S. Cl. 299—18 **14 Claims**



13. A method of increasing the recovery material from the area of a pre-existing generally horizontal generally circular in-cross-section bore of a diameter D in a coal seam or the like utilizing a mining machine having out-cutting means associated therewith which are movable from a first generally inoperative position to a second generally operative position, said method comprising the steps of

a. inserting the mining machine into the pre-existing bore from an exterior area, and reboring the pre-existing bore during in-movement of the mining machine,

b. continuously conveying the cut coal or the like from the bore to the exterior area during in-movement of the mining machine,

c. moving the mining machine out-cutting means from the first position to the second position thereof and maintaining said means in the second position thereof during out-cutting,

d. withdrawing the mining machine from the pre-existing bore to enlarge the pre-existing bore to a bore having a generally rectangular configuration having at least one side thereof having a dimension greater than D, out-cutting taking place during withdrawal, and

e. continuously conveying cut coal or the like from the bore during out-cutting.

4,003,603

IMPACT MEANS FOR RIPPER

Orrin A. Stemler, East Peoria, and Delwin E. Cobb, Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

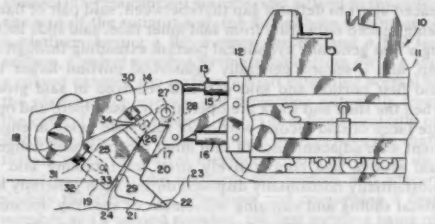
Filed Dec. 1, 1975, Ser. No. 636,784
Int. Cl.² A01B *35/00*
U.S. Cl. 299—37 **12 Claims**

1. In an earth working apparatus having a support, a ripper defining a resiliently deflectible shank and a tooth at one end of the shank, and an impact member having an inner mounting portion and an outer impacting portion, the improvement comprising:

pivot means for pivotally mounting the ripper shank to the support for pivoting about a single pivot axis;

pivot means for pivotally mounting the impact member mounting portion to the support for pivoting about a single pivot axis with said impacting portion defining a contact surface engaging said shank at an inner portion in an undeflected condition of said shank and defining therewith an outwardly widening gap; and

impact force means for urging the impact member outwardly of said inner portion toward said shank with said tooth engaging earth to be loosened to cause said shank



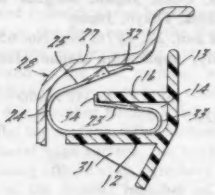
to be deflected into progressively increased gap-closing facial engagement with said contact surface in transferring an impact force from said force means through said deflectible portion to said tooth.

4,003,604

COVER RETENTION SYSTEM

James Connell, 5017 Dianna Drive, Bloomfield Hills, Mich. 48013

Filed Oct. 14, 1975, Ser. No. 622,047
Int. Cl.² B60B *7/04*
U.S. Cl. 301—37 CD **1 Claim**



1. In a cover secured by clips to a vehicle wheel, said cover having spaced flanges on its inner periphery extending inwardly from an outer wall, said clip being made from a spring strip having a first reversely bent portion forming a securing body which extends between said flanges, a sharp struck-out tang on the upper portion of the body engaging the underside of the top flange for cutting thereinto and retaining the clip body between the flanges, the end portion of the clip extending from between the flanges being reversely bent thereover to form an arm portion disposed at an angle, said bend abutting said wheel, an outwardly projecting cutting tang on said arm portion engaging the undersurface of a flange on the wheel, and a right-angle bend at the end of said body providing a flange which engages the inner edge of the top flange to space said first reversely bent portion at the end of the body a predetermined distance from the outer wall between the flanges.

4,003,605

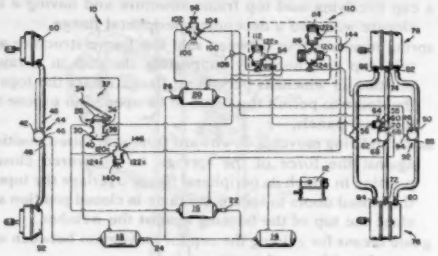
FLUID PRESSURE BRAKING SYSTEM WITH LIMITING VALVE FOR ANTI-COMPOUNDING AND FAIL-SAFE STANDBY VALVE

Richard C. Fannin, Elyria, Ohio, assignor to The Bendix Corporation, South Bend, Ind.

Filed Nov. 28, 1975, Ser. No. 636,384
Int. Cl.² B60T *13/22*
U.S. Cl. 303—6 M **11 Claims**

4. In a vehicle fluid pressure braking system, a brake actuator having a service port connected to a fluid pressure source when a service brake application is effected and fluid pressure responsive parking means for holding the actuator in a brake-

applied condition when a parking application is effected, and limiting valve means limiting fluid pressure communication to said service port upon actuation of said parking means, said limiting valve means being responsive to fluid pressure communication to said parking means to permit substantially uninhibited fluid communication to said service port when the parking means is released and to limit communication to said



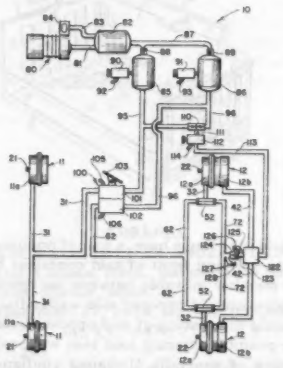
service port when the parking means is actuated, said limiting valve means including an inlet port communicated to said fluid pressure source, an outlet port controlling communication to said service port, and a control port, said limiting valve means being responsive to the fluid pressure level at said control port to establish a fluid pressure level at the outlet port less than the fluid pressure level at the inlet port.

4,003,606

BRAKE SYSTEM

Ronald S. Plantan, Wickliffe, Ohio, assignor to White Motor Corporation, Cleveland, Ohio

Filed Oct. 6, 1975, Ser. No. 620,069
Int. Cl.² B60T *13/36*
U.S. Cl. 303—9 **17 Claims**



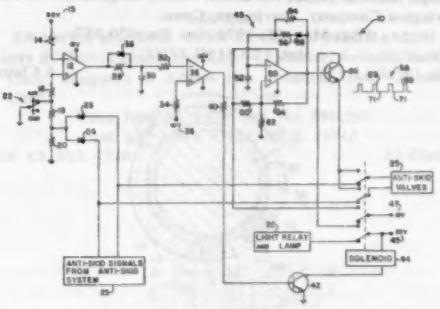
1. A vehicle brake system, comprising:
a. a service brake subsystem;
b. a spring brake subsystem; and,
c. a valve connected to both subsystems for selectively transferring pressurized fluid from said spring brake subsystem into said service brake subsystem to actuate at least a portion of the service brake subsystem.

4,003,607

FAILURE WARNING AND SHUT-OFF FOR ANTI-SKID SYSTEM

James R. Haney, Uniontown, and Edgar J. Ruof, Akron, both of Ohio, assignors to Goodyear Aerospace Corporation, Akron, Ohio

Filed Mar. 24, 1976, Ser. No. 669,944
Int. Cl.² B60T *8/00*
U.S. Cl. 303—92 **12 Claims**



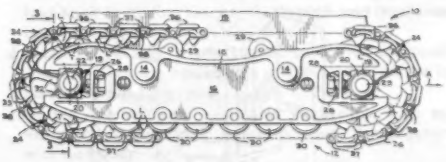
1. In a brake system for a wheeled vehicle having anti-skid circuitry associated with the wheels thereof for producing and applying anti-skid signals indicative of skidding activity of the wheels to anti-skid valves, the improvement comprising:
first circuit means connected to the anti-skid circuitry for receiving the anti-skid signals and producing a first signal if the anti-skid signals exceed a predetermined level;
second circuit means connected to said first circuit means and controlled by said first signal for inhibiting the application of the anti-skid signals to the anti-skid valves; and
third circuit means connected to and controlled by said second circuit means for applying a pulsating signal to the anti-skid valves upon the inhibiting of the application of the anti-skid signals thereto.

4,003,608

CRAWLER DRIVE SYSTEM

Robert M. Carter, Cedar Rapids, Iowa, assignor to FMC Corporation, San Jose, Calif.

Filed July 2, 1975, Ser. No. 592,568
Int. Cl.² B62D *55/08*
U.S. Cl. 305—57 **8 Claims**



1. A crawler drive system for a machine having an endless longitudinally extending crawler track of shoes pivotally connected on lateral axes and having a pair of spaced sprockets lying in a common longitudinal plane to receive said track, each shoe having a pair of lugs, the lugs of each pair being on opposite sides of said common plane and having rear faces spaced apart in the longitudinal direction, the sprockets having a plurality of pairs of teeth, the teeth of each pair being on opposite sides of said common plane and positioned between the lugs of two adjacent shoes, the lugs and teeth on one side of said common plane defining one row of alternate teeth and lugs, and the teeth and lugs on the opposite side of said common plane defining another row of alternate teeth and lugs, the improvement wherein the longitudinal distance between

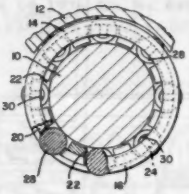
the rear faces of the two lugs on one of said shoes is greater than the distance between the forward faces of the two sprocket teeth immediately behind said lugs so that only the rear lug of the shoe will be engaged by a sprocket tooth in driving engagement at a time.

4,003,609

BEARING CAGE AND ROLLER ASSEMBLY

Joseph Aloysius Juhas, Litchfield, Conn., assignor to The Torrington Company, Torrington, Conn.

Filed Mar. 25, 1976, Ser. No. 670,357
Int. Cl.² F16C *33/38*
U.S. Cl. 308—217 **6 Claims**



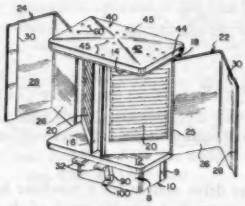
1. A bearing cage and roller assembly comprising: a pair of axially separated end rims; a plurality of circumferentially separated axial crossbars interconnecting the end rims to form roller pockets; at least one pair of oppositely facing short projections extending from the rims into each roller pocket with the axial distance between projections being less than the roller length and with the projections and end rims being sufficiently resilient to permit the placement of rollers having openings in their axial ends into the pocket by inserting one end of the roller in the pocket with the projection extending from one rim received within the opening at that end of the roller and installing the other end of the roller over the projection extending from the other end rim by snapping the roller over said projections; and at least one roller in each of several of the pockets, said roller having openings in its axial ends into which the projections of the end rims extend.

4,003,610

TERMINAL HOUSING

Harold M. Main, Muncie, Ind., assignor to General Cable Corporation, Greenwich, Conn.

Filed Feb. 18, 1975, Ser. No. 550,296
Int. Cl.² A47B *81/00*
U.S. Cl. 312—100 **4 Claims**



1. A terminal housing comprising

frame structure including top and bottom structure and corner members extending therebetween at the rear corners of the housing, said structure leaving the front and sides of the housing substantially open, and including means to mount one or more terminal panels between the top and bottom frame structure and extending generally forward in a horizontally arched configuration from the rear corner members so as to present the front faces of the panels toward the front and sides of the housing,

doors hinged to said frame structure adjacent said rear corner members, said doors having a closed position in which they extend forward from said corner members across the open sides and front of the housing to form a peripherally continuous front and side enclosure between the top and bottom frame structure to cover the exposed front faces of the terminal panels, said doors being movable outward to expose substantially the entire front face area of the panels for service access,

a cap overlying said top frame structure and having a top closure wall and a depending peripheral flange,

spring means acting between said top frame structure and said cap and normally supporting the cap in a raised position in which its peripheral flange clears the tops of the doors to permit the doors to be opened to expose the terminal panels,

said cap being movable downward from said raised position, against the force of the springs, to a lowered closure position in which its peripheral flange overlaps the tops of the closed doors to secure the same in closed position and close the top of the housing against the weather,

guide means for guiding the cap for movement between said raised and lowered positions,

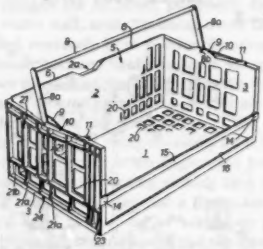
actuating means connected to the cap for moving the same from its spring-supported raised position to its closure position, said actuating means including a lever which moves past dead center against the force of said spring means so as to secure the cap in its lowered closure position.

4,003,611

CONTAINERS

Barrie Smith, Northampton, England, assignor to J. Lyons & Company Limited, London, England

Filed Feb. 3, 1975, Ser. No. 546,307
Int. Cl.² B65D *25/28, 21/00*; 220 *94 R*
U.S. Cl. 312—244 **9 Claims**



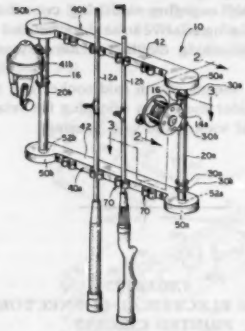
1. A container having a base, a pair of opposed side walls, a rear wall, the top and front of said container being open, a reinforcing member movable between an operative position extending between said opposed side walls adjacent said front for maintaining the spacing of said opposed side walls and an inoperative position adjacent said rear wall, said reinforcing member being of generally U-shaped configuration, means provided for mounting said reinforcing member for pivotal movement between its operative and inoperative positions, and projecting means extending from the upper edge of said rear wall and a recess in the underside of said base for receiving the projecting means on the rear wall of a like container on which said one container is stacked, said reinforcing member being located behind said projecting means on said rear wall when in its inoperative position.

4,003,612

FISHING TACKLE RACK

Robert F. Munsell, 516 W. Jackson Blvd., Ste. 508, Chicago, Ill. 60606

Filed Jan. 16, 1976, Ser. No. 649,655
Int. Cl.² A47F 7/00
U.S. Cl. 312—245 1 Claim



1. A fishing tackle rack for releasably securing fishing reels and poles thereon, comprising:

at least one column for supporting fishing reels, the column having a fishing reel attachment area provided with an outer perimeter against which the yoke of the fishing reel may be releasably secured;

at least two rings composed of resilient material and movable along the perimeter of the column, the rings further having an inside diameter substantially equivalent to the outside diameter of the column and adapted to be stretched to accomodate the yoke of the fishing reel;

whereby the two rings releasably secure the reel to the column by slipping the rings over end portions of the yoke of the fishing reel;

two bases having recessed areas into which the end portions of the column are engageable; and

at least one clamp rigidly attached on a side of each base adjacent the engagement of the column to the base, the clamp being adapted to receive and retain a fishing pole.

4,003,613

APPLIANCE CONTROL CONSOLE STRUCTURE

John G. Oakley, Coloma, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Mar. 17, 1976, Ser. No. 667,904
Int. Cl.² A47B 77/08
U.S. Cl. 312—293 16 Claims

1. Control console structure for use with an appliance having a mounting portion, said console structure comprising:

a pair of end cap assemblies each assembly including a first member, a second member, and locking means for locking said first and second members together;

means for securing said end cap assemblies to the appliance mounting portion in spaced relationship to each other; and

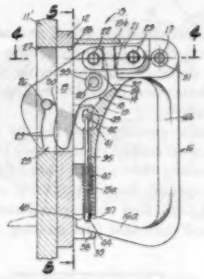
wall means extending between said spaced end cap assemblies for mounting and enclosing appliance control means, said wall means including a cover means having opposite ends mounted to said spaced end cap assemblies.

4,003,614

DRAWER HANDLE WITH LOCKING MECHANISM

Larry A. Geer, Upland, and Ralph L. Sheffer, Arcadia, both of Calif., assignors to Adams Rite Products, Inc., Glendale, Calif.

Filed June 12, 1975, Ser. No. 586,290
Int. Cl.² A47B 95/02; E05C 19/10
U.S. Cl. 312—320 13 Claims



1. A drawer handle with releasable drawer locking means, comprising:

a. a body structure adapted for surface mounting in an upright position on a front member of a drawer;

b. elongated handle means pivoted at one end on said body structure at a position outwardly spaced from said front member for selective swinging movements of its other end to a position of engagement with said body and to a position outwardly spaced from said body, the lower end of the handle being rearwardly angularly extended towards the body;

c. a hook member pivoted on said body at a position outwardly spaced from said front member for swinging movements between locking and non-locking positions, said hook extending rearwardly through said front member for engagement with a keeper;

d. means operatively connecting said hook with said handle, whereby swinging movements of the handle will be imparted to said hook; and

e. spring detent means releasably engageable with said lower end of the handle in said position of engagement with said body.

4,003,615

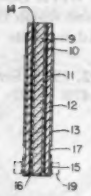
COATED CARBON ELECTRODE HAVING AN INNER COATING OF LOW RESISTANCE MATERIAL

Shigeru Suga, Yoyogi 5-20-2, Shibuya, Tokyo, Japan

Filed Jan. 12, 1976, Ser. No. 648,162
Claims priority, application Japan, Feb. 3, 1975, 50-14693
Int. Cl.² H05B 31/10
U.S. Cl. 314—60 10 Claims

1. A carbon electrode for use in an arc lamp used for determining light fastness, said carbon electrode comprising:

a round central core portion comprised of a mixture of:
light emitting materials,
stabilizer material, and
graphite;
a first coating of low resistance electrically conductive material covering the outside, but not the ends, of said central core portion;
a second coating of adhesive and graphite surrounding said first coating;
a cylindrical carbon tube with said first and second coated



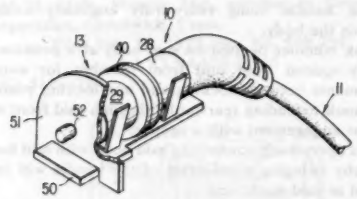
central portion inserted, dried, and adhered thereinto;
a third protective coating surrounding the outside of said cylindrical carbon cylinder above the bottom of said carbon cylinder and beneath the top end of said carbon cylinder; and
a fourth metallic coating covering the bottom end of said first and second coated central core and said carbon tube and surrounding the outside base of said cylindrical carbon tube, spaced from said third coating, electrically connected to said first coating and having a higher electrical resistance than said first coating.

4,003,616

SWIVELLING ELECTRICAL CONNECTOR

William E. Springer, Stratford, Conn., assignor to Clairol Incorporated, New York, N.Y.

Filed Dec. 3, 1975, Ser. No. 637,455
Int. Cl.[2] H01R *39/00*
U.S. Cl. 339—8 R **13 Claims**



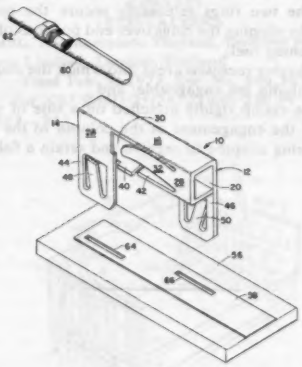
1. An electrical connector for an appliance having a housing wherein the connector couples the appliance to a power cord having three conductors therein, said connector comprising:
a. a plug, said plug comprising:
an insulating body having a plug contact-supporting portion and a cord-engaging portion, wherein said plug contact-supporting portion is cylindrical in cross-section, and said cord-engaging portion has a section extending plug contact-supporting portion;
a first plug contact supported by said plug contact-supporting portion and axially aligned therewith, wherein said first contact is connected to a first conductor of the power cord;
a second plug contact circumferentially supported by said plug contact-supporting portion and connected to a second conductor of said power cord;
a third plug contact circumferentially supported on said plug contact-supporting portion and axially spaced from said second contact in the direction of said power cord, wherein a third conductor of said power cord is connected thereto, and
shoulder means formed on said plug for retaining said plug in said housing;
b. a socket formed in one end of said housing for rotatably receiving said plug, said socket comprising socket contacts slidably engaging said plug contacts to allow rotation of said plug relative to said socket and said housing, while maintaining electrical connections therebetween, and
annular shoulder means within said socket and registering with said shoulder means on said plug for retaining said plug within said socket and said housing.

4,003,617

SOLDERLESS ELECTRICAL CONNECTOR FOR PRINTED CIRCUIT

Roman J. Witek, Jr., Gibraltar, and Stephen J. Grebik, Roseville, both of Mich., assignors to Essex International, Inc., Fort Wayne, Ind.

Filed Mar. 17, 1976, Ser. No. 667,794
Int. Cl.[2] H01R *9/12*
U.S. Cl. 339—17 C **3 Claims**



1. A sheet metal pin receptacle of one-piece stamped and formed construction for mounting on a printed circuit board, said receptacle comprising:
a body member for receiving a pin terminal provided with substantially parallel depending mounting lugs adapted for insertion in openings in a printed circuit board;
said body member including pressure contact means for making electrical contact to said pin terminal;
the portion of said body between said parallel depending mounting lugs comprising first and second wall portions at opposite ends of the body member;
each of said first and second wall portions including a resilient lateral extension extending toward each other, said lateral extensions being inclined outwardly in opposite

transverse directions so as to provide oppositely disposed, outwardly facing longitudinal edges for engagement with a conductor on a printed circuit board;

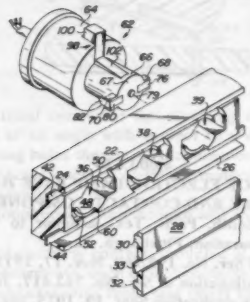
said mounting lugs including a tang lanced therefrom for securing said body member to a printed circuit board.

4,003,618

MULTIPLE SOCKET STRIP

Donald J. Booty, 513 Durham Drive, Frankfort, Ill. 60423

Filed Aug. 14, 1975, Ser. No. 604,585
Int. Cl.² H01R *13/46, 33/46*
U.S. Cl. 339—22 R **14 Claims**



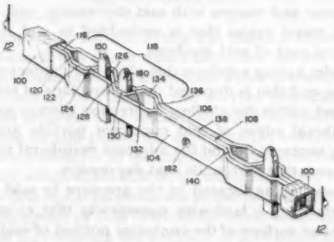
1. A multiple socket strip comprising an elongated body having a plurality of discrete socket holes extending from front to back at spaced locations therealong, first and second spaced elongated conductors, the back of said body having spaced grooves each containing one of said conductors, said grooves being on opposite sides of said holes and spaced therefrom, said body having two channels providing communication between each groove and each hole, a rear cover overlying said back of said body to conceal said elongated conductors and to close off the back end of said holes, means on said body for coupling an electrical potential to said elongated conductors, whereby a plug may be inserted into said holes and can be electrically coupled to said conductors after rotation of the plug about its longitudinal axis.

4,003,619

BUS CONNECTORS

Walter A. Smith, 3607 Sausalito, Los Alamitos, Calif. 90720

Continuation-in-part of Ser. No. 432,708, Jan. 11, 1974, abandoned. This application Apr. 4, 1975, Ser. No. 565,228
Int. Cl.² H01R *9/00*
U.S. Cl. 339—22 B **8 Claims**



1. A bus bar for making connection to connectors which are arranged in a line comprising, in combination:

at least three bars extending side by side such that a first outer bar and a second outer bar lie on opposite sides of a middle bar;

said middle bar being formed at a region along its length such that it meanders to one side and then to the other side of a plane lying between said first and second bars; and

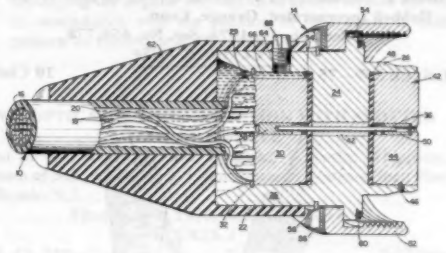
compression means for compressing said bars toward one another, said compression means comprising a sheath encompassing said bars.

4,003,620

PRESSURE COMPENSATED MARINE ELECTRICAL CABLE APPARATUS

Donald G. O'Brien, Wayland, and Edward R. Walker, Natick, both of Mass., assignors to D. G. O'Brien, Inc., Framingham, Mass.

Filed Oct. 12, 1970, Ser. No. 79,781
Int. Cl.² H01R *13/52*
U.S. Cl. 339—29 R **16 Claims**



1. Pressure compensated electrical cable apparatus comprising

A. a liquid-impervious hollow tubular cable jacket extending between first and second ends thereof and flexing radially in accordance with changes in the environmental pressure to diminish the pressure differential across the walls thereof,

B. at least one individually-insulated electrical cable conductor within said jacket extending between said first and second ends,

C. first and second cable terminations, each of which is secured to said cable jacket at the same-numbered end thereof with a liquid-impervious and pressure-withstanding seal between the environment and said jacket interior, and further has an electrical connector conductor connected with said cable conductor within said jacket, and

D. electrically insulative and relatively incompressible fluid filling the interior of said cable jacket.

4,003,621

ELECTRICAL CONNECTOR EMPLOYING CONDUCTIVE RECTILINEAR ELEMENTS

Richard W. Lamp, Mendham, N.J., assignor to Technical Wire Products, Inc., Cranford, N.J.

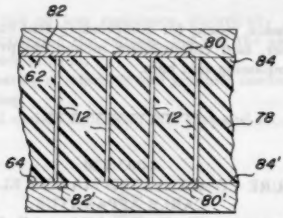
Filed June 16, 1975, Ser. No. 587,062
Int. Cl.² H01R *13/48*
U.S. Cl. 339—59 M **8 Claims**

1. Means for interconnecting electrically conductive areas of a first of at least two spaced-apart surfaces with corresponding electrically conductive areas of a second of the at least two spaced-apart surfaces comprising a combination of

a resilient, electrically non-conductive sheet of elastomer having a first face and a second face substantially parallel to the first face, and

a plurality of from 2,500 to 40,000 electrically conductive linear elements, the linear elements being distributed

substantially evenly throughout said sheet of elastomer and bonded to the elastomer, the linear elements rectilinearly extending from the first face to the second face, the linear elements each being a foil-wrapped textile strand.

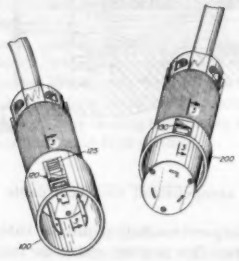


4,003,622

LOCKING SHROUD FOR ELECTRICAL CONNECTOR

Albert J. Gartland, Jr., Trumbull, Conn., assignor to Harvey Hubbell Incorporated, Orange, Conn.

Filed Feb. 17, 1976, Ser. No. 658,778
Int. Cl.² H01R *13/54*
U.S. Cl. 339—75 P **10 Claims**



1. A two-part electrical connector, comprising:
a plug unit having a plurality of male electrical contacts extending from a front face thereof;
a socket unit adapted for mating with said plug unit, said socket unit having a front face with slots therein and a plurality of female electrical contacts beneath said slots to receive the male electrical contacts when the units are mated;
said socket unit including means for locking said plug and socket units against axial disengagement when the mated units are rotated with respect to one another;
a generally cylindrical plug shroud element mounted coaxially on said plug unit;
a generally cylindrical socket shroud element mounted coaxially on said socket unit and conforming circumferentially with said plug shroud element; and
manually actuable means mounted in one of said shroud elements and moveable to engage the other of said shroud elements to prevent relative rotation as between said plug and socket units on their common axis.

4,003,623

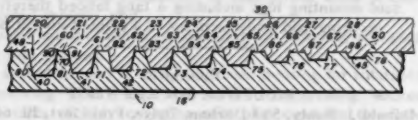
WIRE SECURING MEMBER WITH VARYING SERRATIONS

Charles Edward Reynolds, Mechanicsburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 505,423, Sept. 12, 1974, abandoned. This application Sept. 12, 1975, Ser. No. 665,894
Int. Cl.² H01R *11/20*
U.S. Cl. 339—97 C **20 Claims**

1. A wire securing member for crimping about at least one wire, having a plurality of wire engaging serrations thereupon, comprising:

floors between adjacent serrations, each floor of progressively decreasing depth from the adjacent floor; and



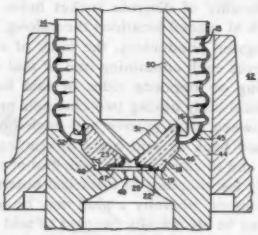
walls defining said serrations of progressively increasing angle in the direction which said floors become of decreasing depth, and of constant angle in another direction.

4,003,624

SNAG-PROOF ELECTRIC LAMP BASE HAVING A SINGLE END-CONTACT COMPONENT

Chrisman O. Smith, Paris, Tex., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 199,760, Nov. 17, 1971, abandoned, which is a continuation of Ser. No. 742,417, July 3, 1968, abandoned. This application Sept. 19, 1975, Ser. No. 614,816
Int. Cl.² H01J *5/56*
U.S. Cl. 339—146 **6 Claims**



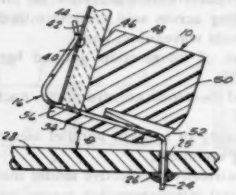
1. As a new article of manufacture that can be handled en masse without causing the articles to snag and damage one another, a base component for an electric lamp or similar device comprising, in combination;
a metal shell,
a molded insulator that is integral with and extends beyond an end of said shell and is terminated by an end face that has an outer peripheral rim,
said insulator having a shallow centrally-located depression in its end face and an aperture that extends through said insulator and merges with said depression, and
a sheet metal eyelet that is embedded in and is thus an integral part of said insulator,
said eyelet having a deformable plate-like contactor portion at one end that is disposed on the end face of said insulator and within the shallow depression thereat so that the peripheral edges of said contactor portion are protectively recessed behind the adjacent peripheral rim of said insulator that surrounds said depression,
said eyelet being located in the aperture in said insulator and defining a lead-wire passageway that extends from the outer surface of the contactor portion of said eyelet to the interior of said metal shell, and
the outer peripheral rim of said insulator having a plurality of spaced indents therein that merge with said depression and together therewith define a plurality of ledges that are substantially flush with the outer surface of the contactor portion of said eyelet.

4,003,625

ELECTRICAL CONNECTOR FOR DATA DISPLAY

Daniel Peter Vladic, Berwyn, Ill., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Filed Apr. 18, 1975, Ser. No. 569,496
Int. Cl.² H05K 1/07
U.S. Cl. 339—176 MP 4 Claims



1. An electrical connector for receiving and mounting a circuit board at an angle with respect to a mounting board having mounting holes therein, said connector comprising: an elongate connector insert of dielectric material having a plurality of passageways

extending transversely therethrough and spaced along said insert;

a plurality of electrical contacts mounted in respective ones of said passageways, each of said contacts including a first end portion extending from said insert to be received in and secured at a respective mounting board hole, and a resilient second portion extending from said insert and directed to clampingly engage and press a circuit board against a side of said insert generally perpendicular to the longitudinal direction of said passageways, said second portion including a circuit board contact portion for electrically contacting a circuit on the circuit board;

said insert including support means coextensive with a section of said second portion to prevent bending of said second portion during insertion of a circuit board; and

means on said insert permitting bending of said contact first portions and pivoting of said insert to a predetermined angle with respect to the mounting board after securement of said contact first portions to place the circuit board in a desired position.

4,003,626

DISTORTION CORRECTION APPARATUS FOR ELECTRO-OPTICAL REFLECTORS WHICH SCAN BEAMS TO PRODUCE IMAGES

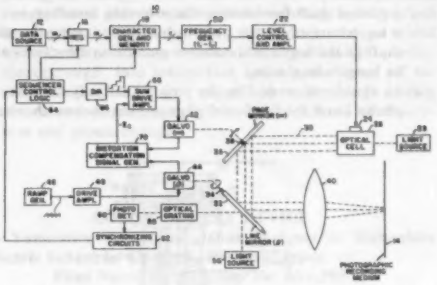
Robert V. Reinke, Penfield; John E. Newton, and Robert L. Reifsteck, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 479,382, June 14, 1974, abandoned. This application Dec. 23, 1974, Ser. No. 535,245
Int. Cl.² G02B 27/17
U.S. Cl. 350—6 4 Claims

1. In apparatus for correcting pin cushion distortion in a pattern formed in a plane which distortion occurs when light beams are scanned in two directions which are perpendicular to each other by first and second mirrors respectively rotatable about separate axes to thereby trace successive lines of said pattern in said plane, the improvement comprising:

a. means responsive to the angular displacement of said first mirror which scans said beam along said lines for providing a first signal proportional to the tangent of the angular displacement of said first mirror about its axis, such first signal representing the position of said beam in said pattern in a first of said two directions;

b. means responsive to the angular displacement of said second mirror which scans said beam along a path between said successive lines for providing a second signal proportional to the tangent of the angular displacement of said second mirror about its axis, such second signal representing the position of said beam in said pattern in a second of said two directions; and



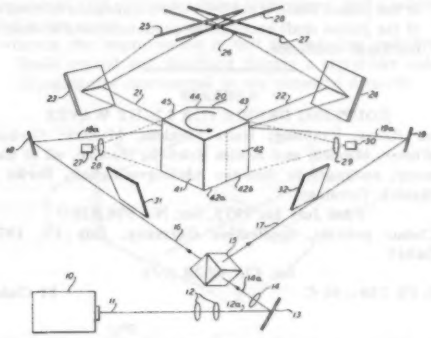
c. means responsive to said first and second signals for modifying the angular displacement of said second mirror in accordance with the position of said beam in said pattern to correct said distortion.

4,003,627

POS OPTICAL SCANNING STATION WITH SLOTTED PLANAR PLATE

Paul S. Wu, Randolph, and Dominick S. Fazio, Whippany, both of N.J., assignors to Litton Business Systems, Inc., Pine Brook, N.J.

Filed May 2, 1975, Ser. No. 574,140
Int. Cl.² G02B 27/17, 5/00
U.S. Cl. 350—7 7 Claims



1. An optical scanning station comprising:

means for generating a predetermined scanning pattern along a given plane; and

a member embodying said scanning pattern in the form of open slots substantially coincident with said given plane;

said scanning pattern comprising at least one pair of overlapping cross-shaped traces;

said member comprising a planar plate containing the outline of said pattern in the form of slots;

said plate being movably mounted relative to an associated housing.

4,003,628

COARSE FOCUS MECHANISM FOR MICROSCOPES

Nathaniel Halperin, San Antonio, Tex., assignor to Zale Corporation, Dallas, Tex.

Filed Nov. 10, 1975, Ser. No. 630,216
Int. Cl.² G02B 7/04, 21/00, 21/26
U.S. Cl. 350—77 11 Claims

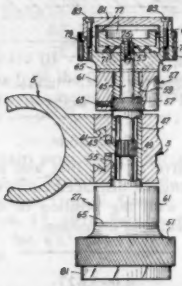
1. A coarse focus mechanism for a microscope having a

frame and cooperating optical and stage members carried by the frame, with at least one of the members being movable relative to the other member, which mechansim comprises, in combination:

a. a pinion shaft for moving the movable member,

b. a knob carried by the pinion shaft for rotating the pinion shaft in clockwise and counter-clockwise directions about its longitudinal axis,

c. an abutment carried by the pinion shaft adjacent one side of the knob for frictional engagement therewith wherein



the abutment is laterally adjustable along the longitudinal axis of the pinion shaft, and

d. a variable slip clutch means carried by the pinion shaft adjacent the opposite side of the knob for pressing the knob against the abutment to thereby impart a predetermined amount of frictional resistance to the knob to permit rotation of the pinion shaft when the knob is rotated such that free rotation of the knob, independent of the pinion shaft, is realized when resistance to rotation of the pinion shaft exceeds the predetermined amount of frictional resistance.

4,003,629

COUPLING DEVICE FOR LIGHT WAVES

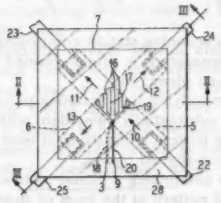
Peter Baues, Krailling; Hans Mahlein, Munich; Gerhard Winzer, Munich, and Achim Reichelt, Munich, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed July 16, 1975, Ser. No. 596,520

Claims priority, application Germany, July 17, 1974, 2434443

Int. Cl.[2] G02B 5/14

U.S. Cl. 350—96 C **11 Claims**



1. A device for coupling light waves from one waveguide to another comprising in combination

A. two elongated waveguides,

1. each one comprised of an electro-optical crystal and adapted for the travel of predetermined light waves along a predetermined direction therein extending longitudinally therethrough,

2. the index of refraction of one of said waveguides being n_1, the index of refraction of the other of said waveguides being n_2,

B. said waveguides being interrelated by having

1. n_1 greater than n_2 when said waveguides are both in an electric field free state,

2. n_1 less than n_2 when said waveguides are both in an electric field of predetermined strength,

3. spatial variations of n_1 and n_2, when said waveguides are both in an electric field of predetermined strength,

C. said waveguides being spatially oriented in adjacent relationship to one another with

1. said predetermined direction of one said waveguide extending across said predetermined direction of the other said waveguide, and

2. a zone of intersection defined between said waveguides,

D. a pair of electrode constructions, each one being comprised of

1. a plurality of spaced, parallel electrically conductive grating members,

2. an electrically conductive leader member,

3. electrical interconnection means joining each of said grating members to said leader member,

E. each one of said electrode constructions being spatially oriented

1. adjacent a different one of said waveguides with said intersection zone therebetween,

2. with the grating members thereof in spaced, parallel relationship to the grating members of the other thereof,

F. dielectric insulation means interposed between each of said electrical constructions and its adjacent said waveguide, each said insulation means having an index of refraction which is substantially lower than each of n_1 and n_2 when said insulation means is either in an electric field free state or in said electric field, and

G. substrate means adapted to support said waveguides, said electrode constructions, and said insulation means.

4,003,630

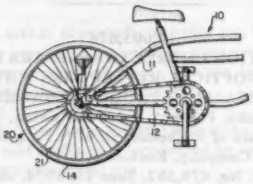
BICYCLE SAFETY REFLECTOR

Norbert A. Kirk, 43 E. Ohio St., Room 930, Chicago, Ill. 60611

Filed Oct. 11, 1974, Ser. No. 514,270

Int. Cl.[2] G02B 5/12

U.S. Cl. 350—99 **14 Claims**



1. A safety reflector device for a bicycle having spoked wheels, said safety reflector device comprising:

a shaft member;

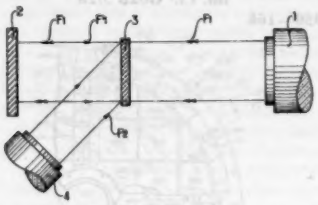
a reflective member mounted on a first end of said shaft member for revolving rotation thereon through a full 360°; and

means for mounting said shaft member in a position adjacent to a side of a wheel of a bicycle with the reflective member on said shaft member positioned adjacent the side of said wheel such that a revolving wheel engages said reflective member to effect rotation of said reflective member about said shaft member through 360° so that opposite edges of said reflective member are alternately brought into contact with the spokes of the wheel thereby providing 360° visibility of the reflective member, said mounting means comprising means for mounting the other end of said shaft at least in proximity to the rotational axis of said wheel so that said shaft member extends radially outwardly from said rotational axis.

4,003,631
DEVICE FOR BLOCKING A LASER BEAM

Jean-Pierre Biet, Verrieres le Buisson, and Michel Duchet, Briis Sous Forges, both of France, assignors to Compagnie Generale d'Electricite, Paris, France

Filed June 5, 1975, Ser. No. 584,227
Claims priority, application France, June 21, 1974, 74.21625; Sept. 30, 1974, 74.32861
Int. Cl.² G02F 1/16
U.S. Cl. 350—160 R 14 Claims



1. In a laser apparatus including a laser generator for emitting a laser beam along an optical axis in a forward direction to a target which reflects the beam in the reverse direction along the axis back to the laser generator, the improvement comprising:

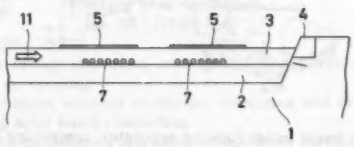
a. a plate made of a semi-conductive substance positioned on the axis between the laser generator and the target and having opposite parallel first and second faces, said plate being positioned so that said faces are sequentially crossed by the emitted laser beam, said plate being transparent to the emitted beam; and

b. means for rendering said plate opaque to the reflected beam, said rendering means comprising means for generating charge carriers on one of the plate faces after the plate is crossed by the emitted beam and before the reflected beam reaches the plate in the reverse direction, thereby blocking transmission of the reflected beam through the plate and preventing the laser generator from being damaged by the reflected beam.

4,003,632
OPTOELECTRONIC SEMICONDUCTOR DEVICE

Yoshio Komiya; Eiichi Suzuki, both of Tanashi, and Yasuo Tarui, Higashi-Kurume, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Mar. 26, 1975, Ser. No. 562,134
Claims priority, application Japan, Apr. 3, 1974, 49-36888
Int. Cl.² G02F 1/20; G02B 5/14; H01L 33/00
U.S. Cl. 350—160 R 12 Claims



1. An optoelectronic semiconductor device comprising:

a semiconductor substrate;

a first insulating layer covering the major surface of said semiconductor substrate;

a second insulating layer of Ta_2O_5 lying on said first insulating layer, said second insulating layer having a higher refractive index than said first insulating layer and constituting an optical waveguide together therewith;

an electrode provided at a desired position on said second insulating layer;

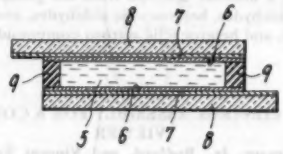
charge-storing means in said second insulating layer below said electrode for storing electric charge as nonvolatilizably memorized information;

whereby portions of said second insulating layer other than the portion positioned under said electrode are capable of transmitting without substantial loss coherent guided light having an energy lower than that corresponding to the energy band gap of said second insulating layer, and an interaction is caused between the electric charge stored by said charge-storing means and said guided light passing therethrough, said interaction causing a change of the state of electric charge stored by said charge-storing means and causing said light to be modulated by absorption and phase change.

4,003,633
COLOR DISPLAY DEVICE

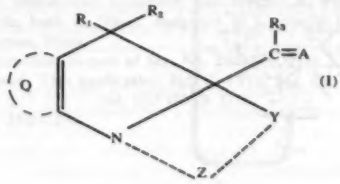
Akio Yamashita, Kawanishi, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Nov. 19, 1975, Ser. No. 633,395
Claims priority, application Japan, Nov. 26, 1974, 49-136783
Int. Cl.² G02F 1/13; C09K 3/34
U.S. Cl. 350—160 LC 7 Claims

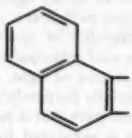


1. A color display device comprising a pair of electrodes which are disposed with a specified space therebetween, at least one of said electrodes being transparent, and a solution filled in the space,

wherein the improvement is that the solution includes a liquid crystal and dissolved therein a styryl-like color-changing dye represented by the chemical formula:



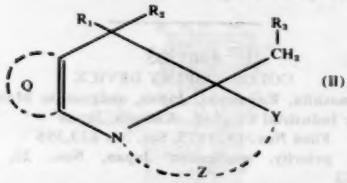
wherein Q represents a benzene ring with or without substituted radicals or Q represents



R_1 and R_2 represent a member selected from the group consisting of lower alkyl radicals, hydroxy-alkyl radicals and alkoxy-alkyl radicals; R_3 represents a member selected from the group consisting of hydrogen, alkyl radicals, alkoxy-radicals, halogen, a nitrile radical, aromatic radicals and phenoxy radicals, Y represents a member selected from the group consisting of oxygen and sulfur; Z represents an unsubstituted or alkyl substituted alkylene radical of 2 to 4 carbon atoms which alkylene radical forms a ring structure together with

$$-N-\overset{\overset{\|}{}}{C}-Y-;$$

and A represents the radical formed when said dye is produced by a condensation reaction of the methyl radical or methylene radical in the 2- position of a precursor indoline derivative represented by the formula:



(II)

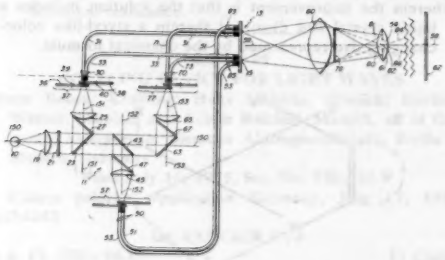
where Q, R_1, R_2, R_3, Y and Z are defined as in formula (I) above with a member selected from the group consisting of aromatic aldehydes, heterocyclic aldehydes, aromatic nitroso compounds and heterocyclic nitroso compounds.

4,003,634

OPTICAL CONTROL ASSEMBLY FOR A COLOR DESIGN VIEWER

Michael Graser, Jr., Bedford, and Vincent Francis Bilotta, Norwood, both of Mass., assignors to Technical Operations Incorporated, Boston, Mass.

Filed Aug. 12, 1974, Ser. No. 496,634
Int. Cl.² G02B 27/14, 27/38
U.S. Cl. 350—162 SF **13 Claims**



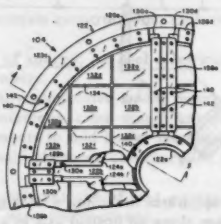
1. An optical apparatus incorporating a plurality of cooperating subsystems for providing with each subsystem a plurality of spectrally-unique light components from a source of light having spectral bandwidth encompassing all of said components, comprising means to direct light from such a source when present in a principal path that is unique to one only of said subsystems to a plurality of spectral selection means arranged sequentially in said principal path for deriving said components from said source of light, and means to direct each component substantially perpendicularly away from said principal path on a unique path that is substantially normal to said principal path and is separated from the paths of the remaining components, each of said subsystems having three spectral components, the unique paths of the first and third components along said principal path extending in a first direction, and the unique path of the component that is between said first and third extending in a second direction that is substantially perpendicular to said first direction, said subsystems being arrayed about the location of said source when present so that their respective principal paths extend radially in different directions from said location substantially perpendicular to an axis passing through said location, the unique paths of the first and third components in each said subsystem being oriented substantially parallel to said axis.

4,003,635

MOSAIC INTERFERENCE FILTER

Walter H. Ottersberg, Floral Park; Michael T. Rubertone, New Hyde Park, and Tarald H. Oigarden, Cold Spring Harbor, all of N.Y., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 27, 1968, Ser. No. 717,489
Int. Cl.² G02B 5/28
U.S. Cl. 350—166 **4 Claims**



1. An optical filter comprising:

a plurality of filter segments of substantially the same filter characteristics in abutting relationship secured to a substrate and forming a mosaic pattern on said substrate with the space between said segments sealed with an opaque material, for providing a narrow band interference filter with a high percentage of transmission at a selected wavelength; and

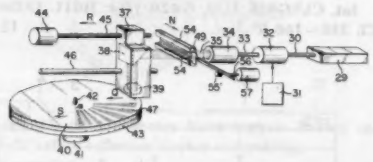
a supporting structure to which said substrate is secured by a substantially compressional force.

4,003,636

LINEAR IMAGE FORMING APPARATUS

Takeshi Goshima, Tokyo, and Kiyonobu Endo, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 12, 1974, Ser. No. 531,877
Claims priority, application Japan, Dec. 19, 1973, 48-143212
Int. Cl.² G02B 5/18
U.S. Cl. 350—162 R **3 Claims**



1. A linear image forming apparatus, comprising in combination:

a beam generator to generate a light beam;

a filter provided with a plurality of rectangular slits for diffracting said light beam from said beam generator thereby providing partial expansion thereof, said slits being arranged in parallel to each other to permit the light beam from said beam generator to pass therethrough in rectangular form, the width of each said slit being made different from the others, and the space interval between the adjacent slits also being different; and

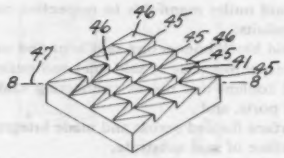
a converging lens to irradiate the beam passed through said plurality of slits in said filter and to converge the irradiated beam, thereby forming a linear image on the focal plane of the lens.

4,003,637

FOCUSING SCREEN FOR REFLEX CAMERAS HAVING INTEGRAL RANGE FINDER MEANS

Seiichi Masuoka, Tokyo, Japan, assignor to A. I. C. Photo, Inc., Carle Place, N.Y.

Filed June 11, 1975, Ser. No. 586,142
Claims priority, application Japan, Oct. 23, 1974, 49-122264
Int. Cl.² G02B 5/04; G03B 13/28
U.S. Cl. 350—286 3 Claims



1. An improved range finder type focusing screen for reflex camera comprising: a generally planar translucent member forming the body of said screen, said member having upper and lower surfaces; one of said surfaces defining a generally centrally disposed first area having a peripheral border, and a second area surrounding said first area and having a second peripheral border; said first area having a first plurality of microprisms formed on said surface, and oriented to refract light rays falling thereon along an axis substantially perpendicular to the plane of said translucent member in a first direction having a first vector component lying in said plane; said second area having a second plurality of microprisms oriented to refract light rays falling thereon along axes substantially perpendicular to said last mentioned plane in a second direction having a second vector component equal in magnitude to said first vector component and lying in said plane and extending in a direction opposite that of said first vector component; whereby portions of an out-of-focus image cast upon said first and second areas will appear mutually displaced along an axis parallel to that of said first and second vector components, and blurred to a degree depending upon the distance said portions are mutually displaced.

4,003,638

RADIANT ENERGY COLLECTION

Roland Winston, Chicago, Ill., assignor to The University of Chicago, Chicago, Ill.

Continuation of Ser. No. 429,161, Dec. 28, 1973, Pat. No. 3,923,381. This application Sept. 15, 1975, Ser. No. 613,577
The portion of the term of this patent subsequent to Dec. 2, 1992, has been disclaimed.
Int. Cl.² G02B 5/10
U.S. Cl. 350—293 7 Claims

1. Solar energy collection and utilization apparatus, said apparatus comprising:

a concentrator element means for collecting and concentrating solar energy including,

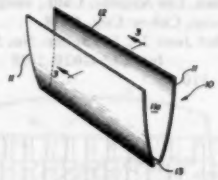
a pair of longitudinally extending substantially parallel walls having substantially concavely sloping opposing inner solar energy reflective surfaces, the upper edges of said surfaces defining solar energy inlet means,

said concentrator element having an optical axis determinable by reference to distances separating opposing upper reflecting surface edges,

said concentrator element further having a field of acceptance for solar energy and an angular acceptance including a maximum angle of acceptance within said field, determinable at said energy inlet and with respect to said optical axis; and

solar energy trap means operatively associated with said concentrator element reflecting surfaces for receiving solar energy concentrated by said surfaces,

the profile curve of at least a portion of each said concavely sloping reflecting surface being shaped to substantially assume the maximum possible slope consistent with reflecting the maximum angle solar energy rays which enter the concentrator energy inlet means within said field of acceptance onto said solar energy trap means, and wherein



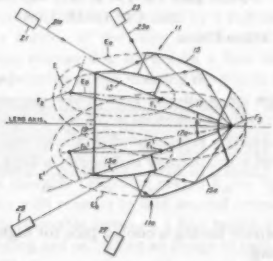
the dimensions of said energy inlet and said profile curve of said reflecting surfaces are such that said field of acceptance is capable of including an arc segment of coordinates equal to those described by the apparent motion of the sun within at least one hour before and after reaching zenith point at solstice.

4,003,639

CATOPTRIC LENS ARRANGEMENT

Philip J. McFarland, Lynnfield, and Werner R. Rambauske, Carlisle, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Continuation-in-part of Ser. No. 268,270, July 3, 1972, abandoned. This application July 3, 1975, Ser. No. 592,832
Int. Cl.² G02B 5/10
U.S. Cl. 350—294 3 Claims



1. In a catoptric arrangement for combining optical energy from a plurality of sources, the improvement comprising:

a. at least a first and a second plurality of mirror assemblies disposed about a common axis, each one of such assemblies including a convex entrance mirror and a concave secondary mirror for focusing optical energy at a focal point; and

b. common mounting means for all of the convex entrance mirrors and all of the concave secondary mirrors, such

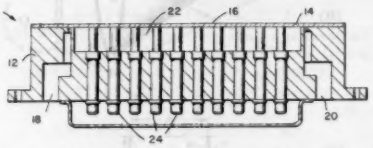
mounting means being formed to support the first plurality of mirror assemblies at a first distance from the common axis and to support the second plurality of mirror assemblies at a second distance from the lens axis.

4,003,640

ELECTRO-HYDRAULIC DRIVER FOR DEFORMABLE FACE PLATE

Siegfried Hansen, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed June 23, 1975, Ser. No. 589,510
Int. Cl.² G02B *5/08*
U.S. Cl. 350—310 **4 Claims**



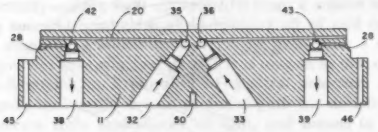
1. In combination:
a body;
a plurality of electro-hydraulic-mechanical actuators, each of said actuators having a housing, and each of said actuators having an electro-mechanical device, a mechanical-hydraulic valve, a hydraulic-mechanical piston and a spring each mounted with respect to said body;
each said electro-mechanical device being mounted between said body and said valve so that upon electrical actuation of said electro-mechanical device, said electro-mechanical device moves a portion of said valve to control hydraulic flow through said valve to control hydraulic pressure on said piston, said piston being connected to said spring and said spring being connected to said body so that upon change in hydraulic pressure on said piston, said piston moves with respect to said body by resilient deflection of said spring; and
a face plate mounted with respect to said body, each of said pistons engaging with said face plate to deflect said face plate so that the shape of said face plate is controlled by electric signals to said electro-mechanical devices.

4,003,641

LOW DISTORTION HIGH ENERGY LASER MIRROR

Theodore A. Heinz, Moorpark, Calif., and Charlton Dunn, III, Berwyn, Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 25, 1975, Ser. No. 598,978
Int. Cl.² G02B *5/08*
U.S. Cl. 350—310 **6 Claims**



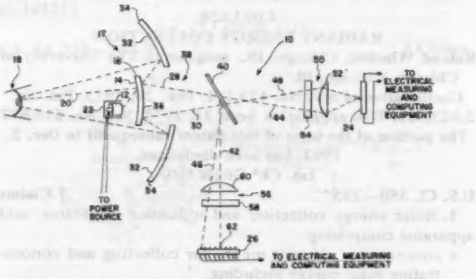
1. A mirror having a cooled face for high energy reflection comprising:
a mirror substrate in substantially rectangular block form;
a plurality of coolant slots disposed in parallel relationship in the surface of said substrate designated as the major surface;
a common inlet conduit on one side of said substrate at one of the ends of said slots and means connecting alternate ones of said slots to said conduit;
a common outlet conduit on said one side of said substrate and means connecting the other ones of said slots to said outlet conduit;
an outlet conduit on the other side of said substrate at the other ends of said slots and means connecting said alternate ones of said slots thereto;
an inlet conduit on said other side of said substrate and means connecting the remaining ones of said slots to said inlet conduit;
inlet and outlet coolant ports in the surface of said substrate opposite said slots;
at least two inlet manifolds in said substrate and means connecting said inlet manifolds to respective ones of said inlet conduits;
at least two outlet manifolds in said block and means connecting said outlet manifolds to respective ones of said outlet conduits;
means in said block connecting said inlet and outlet manifolds to respective ones of said inlet and outlet ports;
a supply of coolant and means connecting said supply to said inlet ports; and
a mirror surface formed across and made integral with said major surface of said substrate,
whereby said mirror surface may be cooled by counter flow of coolant in adjacent slots across said major surface thereof and said substrate may be cooled by counter flow of coolant through said means connecting said conduits, manifolds and ports therein.

4,003,642

OPTICALLY INTEGRATING OCULOMETER

Arthur W. Vogeley, Yorktown, Va., assignor to Bio-Systems Research Inc., Yorktown, Va.

Filed Apr. 22, 1975, Ser. No. 570,853
Int. Cl.² A61B *3/10*
U.S. Cl. 351—6 **5 Claims**



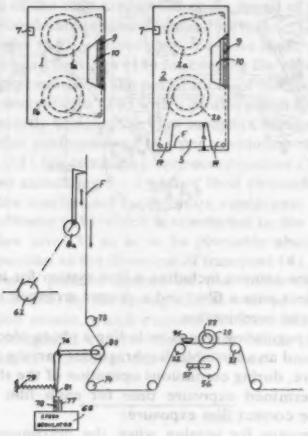
1. An improved oculometer which comprises:
radiation source means;
directing means for focusing and directing the emissions from said radiation source onto an observers eye;
optical integration means which processes the reflections from the observers eye by compressing the optical field in at least one dimension so that the optical field of the reflections is converted into a linear form with varying light information along its length; and
linear sensing array means comprising a series of individual sensing elements upon which the linear form of the reflections are focused which yield electrical information varying with the intensity of radiation falling on the individual elements of the array.

4,003,643

MOTION-PICTURE CAMERA ACCOMMODATING SILENT-FILM AND SOUND-FILM CASSETTES

Otto Freudenschuss; Otto Kantner, and Peter Revy von Belvard, all of Vienna, Austria, assignors to Karl Vockenhuber and Raimund Hauser, both of Vienna, Austria

Continuation-in-part of Ser. No. 460,136, April 11, 1974, abandoned. This application Mar. 22, 1976, Ser. No. 669,085
Claims priority, application Austria, Apr. 16, 1973, 3383/73
Int. Cl.² G03B 31/00
U.S. Cl. 352—14 7 Claims



1. A motion-picture camera for alternatively exposing a silent film contained in a cassette of a first type and a sound film contained in a cassette of a second type differing in shape from that of said first type, the film being accessible with either type of cassette at an upstream location for illumination and with said second type of cassette also at a downstream location for sound recording, comprising:

a casing forming a cassette-receiving chamber and an image gate opening into said chamber;

first feed means in said chamber engageable with the film of an inserted cassette at said upstream location for intermittently transporting said film past said image gate;

sound-recording means in said chamber positioned for co-operation with the film of an inserted cassette of said second type at said downstream location;

second feed means in said chamber engageable with the film of an inserted cassette of said second type at said downstream location for transporting the film past said sound-recording means at a substantially constant speed;

drive means for actuating said first and second feed means, said drive means including a motor operatively coupled with said first feed means;

sensing means in said casing for detecting the presence of a cassette of said second type in said chamber;

first speed-regulating means for stabilizing the operating speed of said motor with a cassette of said first type;

second speed-regulating means for controlling said drive means to maintain a substantially constant length of film between said upstream and downstream locations with a cassette of said second type; and

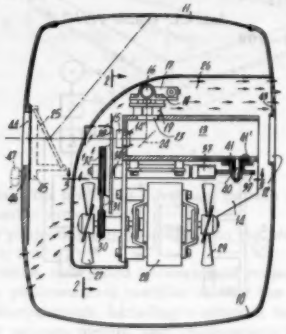
switchover means responsive to said sensing means for activating said first speed-regulating means to the exclusion of said second speed-regulating means in the absence of a cassette of said second type and for activating said second speed-regulating means to the exclusion of said first speed-regulating means in the presence of a cassette of said second type.

4,003,644

CINEMATOGRAPHIC VIEWER-PROJECTOR

Angela Aruanno, Milan, Italy, assignor to Lamy S.r.l., Milan, Italy

Filed Jan. 23, 1974, Ser. No. 435,991
Claims priority, application Italy, Jan. 25, 1973, 19584/73; Dec. 31, 1973, 32426/73
Int. Cl.² G03B 21/10
U.S. Cl. 352—72 5 Claims

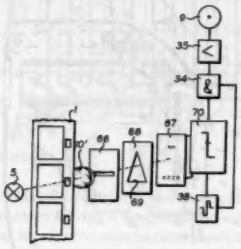


1. A projector-viewer for motion picture films continuously unwinding and winding on a spool within a magazine, comprising, in combination, a case having a translucent wall operating as a screen, and defined in another wall first opening for inserting and removing the magazine; a frame mounted internally of said case defining a magazine housing which at one outer opened end thereof communicates with said first opening in said case for the passage of the magazine, while the other opposite end thereof has an exposition opening across which the film passes for exposing a frame of the film moving in front of the exposition opening and an optical projection system aligned with the exposition opening, a light source mounted on a larger side of the magazine housing which extends between said one outer opened end and the other opposite end, said larger side having an opening located to correspond with the light source so that the light from the light source passes therethrough to be reflected by a mirror on the magazine onto the frames of the film; an electrical motor controlling a rotating shutter disc having on a face thereof a U-shaped cam for operating a claw drawing the film in front of the exposition opening, and also controlling by means of mechanical drives a pin for the film spool in the magazine and cooling fans, said case having defined therein a second opening in front of the optical projection system and a reflecting means carried on a movable reflecting means frame mounted on said case slidably with respect to said second opening and being mounted to be movable between a first position covering said second opening and reflecting an image to said screen, and a second position uncovering said second opening, a stationary frame secured to said case in registry with said second opening, said stationary frame having projection window masked by a transparent means, said reflecting means including an inclined mirror and the movable frame carrying the inclined mirror at a position inwardly of the case, and a control handle outwardly projecting from a slit defined in the stationary frame for imparting a sliding movement to the movable frame relative to the stationary frame for moving the reflecting means.

4,003,645
FILM-HANDLING APPARATUS

Heinz Broeckl, Gmund; Friedrich Forch, Vienna; Otto Freudenschuss, Vienna; Eduard Keznickl, Vienna; Gottfried Patels, Vienna, and Leopold Rollenitz, Totzenbach, all of Austria, assignors to Karl Vockenhuber and Raimund Hauser, both of Vienna, Austria

Division of Ser. No. 189,623, Oct. 15, 1971, Pat. No. 3,806,244. This application Feb. 11, 1974, Ser. No. 441,000
Claims priority, application Austria, Oct. 20, 1970, 9455/70; Nov. 5, 1970, 9983/70; Nov. 19, 1970, 10457/70; Nov. 24, 1970, 10601/70; Mar. 4, 1971, 1893/71; Apr. 6, 1971, 2944/71
Int. Cl.² G03B *41/10*
U.S. Cl. 352—109 5 Claims



1. An apparatus for handling an elongate recording strip for optical information, said strip being provided with optically detectable marks, comprising:

feed means for continuously advancing said strip past an information-transfer point;

a source of light rays incident upon said strip at said transfer point;

optical means forming said light rays into a beam generally perpendicular to said strip at said transfer point;

light-deflecting means in the path of said beam pivotable about an axis transverse to the direction of advance of said strip;

reciprocating drive means for said light-deflecting means provided with a control circuit responsive to electrical signals for keeping said beam trained upon a specific area of the advancing strip in a relatively slow forward sweep during a major portion of a recurrent operating cycle and for restoring said beam to an initial position in a relatively fast return sweep during a terminal phase of said cycle;

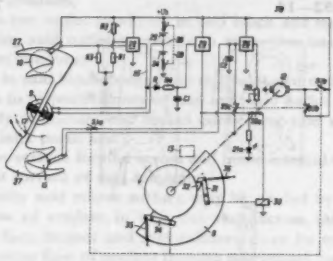
signal-generating means for said control circuit producing a pair of consecutive pulses of opposite polarities in said terminal phase for effecting said return sweep and arresting said light-deflecting means in said initial position, respectively; and

synchronizing means controlled by said feed means for triggering said signal-generating means and matching said forward sweep to the advance of said strip, said synchronizing means including a detecting circuit provided with photoelectric means positioned to receive light from said marks, electronic switching means connected to said photoelectric means for energization thereby, said switching means having an output connected to said signal-generating means for triggering same into emission of said pair of pulses in response to a predetermined output voltage from said photoelectric means, focusing means in said detecting circuit, and masking means for partly obstructing the transmission of light from said marks through said focusing means to said photoelectric means, said masking means having an aperture of nonuniform width for causing generation of said predetermined output voltage from said photoelectric means in a limiting position of a mark.

4,003,646
CINE CAMERAS

Otto Freudenschuss, and Gerd Kittag, both of Vienna, Austria, assignors to Karl Vockenhuber and Dennis Hauser, both of Vienna, Austria

Filed Oct. 22, 1975, Ser. No. 624,650
Claims priority, application Austria, Oct. 24, 1974, 8543/74
Int. Cl.² G03B *9/58*, *19/18*
U.S. Cl. 352—141 14 Claims



1. In a cine camera including a lens system for image light from a subject onto a film; and a shutter arranged in the path of the light; in combination

exposure regulating means including a photo-electric transducer and an adjustable diaphragm for varying the filming aperture, during continuous operation of the shutter with predetermined exposure time for each film frame, to provide correct film exposure;

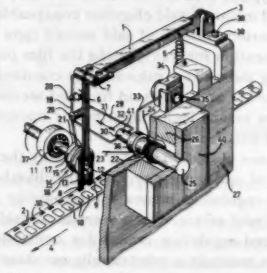
sensing means for sensing when the maximum available aperture is inadequate for correct exposure within the said predetermined exposure time; and

means operable in response to an output of said sensing means for holding the shutter open, for each film frame, for a sufficient time to achieve correct exposure.

4,003,647
CLAW MECHANISM

Bernardus Johannes Kuppens, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 4, 1975, Ser. No. 610,327
Claims priority, application Netherlands, Sept. 10, 1974, 7411986
Int. Cl.² G03B *1/22*
U.S. Cl. 352—194 6 Claims



1. A claw mechanism for the transport of a perforated record carrier, in particular a film (2) in a film projector, along a transport path, and comprising:

a claw arm (1) which is disposed substantially parallel to the transport path and which is pivotable about a pivoting spindle (3) transverse to the direction of transport of the record carrier,

a spring (5) which loads the claw arm in a direction towards the transport path,

a claw means (6) having one or more claw teeth, which means extends substantially transversely to the transport path and which is connected to the free end of the claw arm (1) and is pivotable about a spindle (7) which is also transverse to the direction of transport,

a drive shaft (11) which is disposed parallel to said two pivoting spindles (3, 7) and which rotates continuously during operation, and a crank (12) which cooperates with a slot (13) in the claw means (6), as well as

electromagnetic control means for controlling the movements of the claw arm and thus the speed of transport of the record carrier, characterized in that:

a cam roller (14), is disposed on the drive shaft, which roller comprises a first cam (15) for keeping the claw means out of engagement with the perforations of the record carrier, and a second cam (16) with a profile which is adapted for temporarily bringing the claw means (6) into engagement with the perforations (10) per revolution of the drive shaft (11) for advancing the record carrier (2), the cam profiles coinciding for a part of their circumference, and the claw mechanism furthermore comprises:

a cam follower (19) which is connected to the free end of the claw arm (1) so as to be pivotable about a spindle (20) parallel to the direction of transport (4), which cam follower is pressed against the cam roller (14) with its free end (21) by the spring (5), as well as

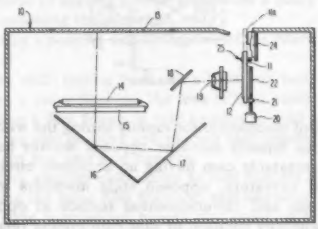
connection means, which connect the cam follower to the electromagnetic control means and which transmit the movements thereof to the cam follower.

4,003,648

APPARATUS FOR MAKING ELECTRICAL CONTACT WITH AN ELECTROPHOTOGRAPHIC FILM

Frank C. Gross, Wilbraham, Mass., assignor to A.B. Dick/-Scott, South Hadley, Mass.

Filed Apr. 23, 1975, Ser. No. 570,821
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 R **8 Claims**



1. In an apparatus for imaging an electrophotographic film comprising an enclosure within which the film is imaged, a carrier for holding the film while it is imaged, and reciprocating means for moving the carrier holding the film to and from a load position and an imaging position,

the improvement of electrical connective means for establishing electrical contact with an electrically conductive area on the surface of the film comprising:

an electrical contact member connected to the carrier for making electrical contact with the conductive area;

engagement means for moving the contact member into electrical contact with the conductive area of a film placed on the carrier in response to movement of the carrier from the load position to the imaging position; and

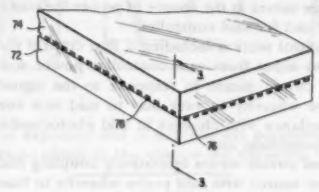
disengagement means for moving the contact member away from the film in response to movement of the carrier from the imaging position to the load position.

4,003,649

ELECTROPHOTOGRAPHIC HALFTONE PRINTING MACHINE EMPLOYING A PHASE SCREEN

Robert Nathan Goren, Rochester, N.Y.; William Streifer, Palo Alto, Calif., and Lawrence Morton Marks, Mississauga, Canada, assignors to Xerox Corporation, Stamford, Conn.

Filed Mar. 7, 1975, Ser. No. 556,387
Int. Cl.² G03G *15/01*
U.S. Cl. 355—4 **22 Claims**



1. Apparatus for providing a halftone pattern on a photosensitive member comprising:

means for projecting a light image onto the photosensitive member; and

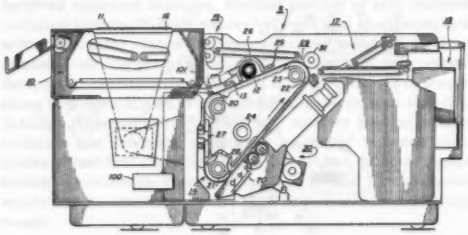
a phase screen, interposed between said projecting means and the photosensitive member so that the light image passes therethrough, including a substrate having a plurality of grooves therein, said phase screen transmitting light therethrough, in which light transmitted only through the substrate is phase shifted with respect to light passing through both the grooves and the substrate, the grooves being of a preselected depth so that the light transmitted therethrough forms a halftone pattern of the light image on said photosensitive member having substantially the same spatial frequency over a predetermined extended range of wavelength of light.

4,003,650

CONTROLLER FOR REPRODUCTION APPARATUS

John E. Courtney, Fairport; Charles J. Urso, Webster, and Charles D. Wilson, Pittsford, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 5, 1974, Ser. No. 521,102
Int. Cl.² G03G *15/00*
U.S. Cl. 355—14 **4 Claims**



1. In an apparatus for controlling the electrostatic development field in a reproduction machine to enhance development of the latent electrostatic images on the photoconductive member of said reproduction machine, the reproduction machine including as components contributing to said electrostatic development field, charging means for charging the photoconductive member in preparation for imaging, exposing means for exposing the charged photoconductive member to provide a latent electrostatic image of the original on the member, and developing means for developing the image, the combination of

a potential controller including a probe operatively arranged adjacent said photoconductive member to sense

potentials on said member and a control section adapted to control a power source for biasing at least one of said reproduction machine components in response to changes in potential on said photoconductive member as sensed by said probe; said probe producing a signal indicative of the potential on said photoconductive member,

said controller having an internal power source for driving said controller;

a first circuit means operatively coupling said controller power source with at least one of said reproduction machine components whereby the controller's own power source serves as the source of power for said one component and for said controller;

said control section including a first control for regulating power input from said controller power source to said first circuit means in response to the signal from said probe whereby to vary bias to said one component in accordance with changes in said photoconductive member potentials; and

a second circuit means operatively coupling said controller power source with said probe whereby to bias said probe and neutralize probe spacing effects,

said control section including a second control for regulating power input from said controller power source to said second circuit means in response to the signal from said probe whereby to vary bias to said probe in accordance with changes in said photoconductive member potentials, said controller including

means to enable the potential control point of said controller to be selected,

said control section providing control signals reflecting the relationship between the potential control point selected and the potential sensed by said probe for each of said first and second controls.

4,003,651

SYSTEM FOR RECORDING IMAGES RECEIVED BY FACSIMILE

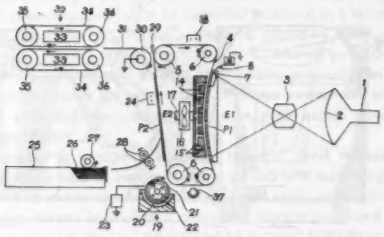
Yoshisuke Hashida, and Tsuneo Hibino, both of Hachioji, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Jan. 24, 1975, Ser. No. 543,903

Claims priority, application Japan, Jan. 28, 1974, 49-11964; Jan. 28, 1974, 49-12107[U]

Int. Cl.² G03G *15/00*

U.S. Cl. 355—16 **4 Claims**



1. An image recording system for use in combination with a facsimile in which a series of light spots scanning in sequence on the screen surface of a flying-spot scanner tube are projected onto a photosensitive sheet through an optical system to produce a latent image composed of said series of light spots on said photosensitive sheet and said latent image is visualized by use of toner, said system comprising: a carrying member movable along a fixed path containing a projection station of said optical system, two photosensitive sheets mounted on said carrying member is such a manner that one of said photosensitive sheet is positioned at said projection station while the other of said photosensitive sheet is position at another fixed position, means for mounting said two photosensitive sheets on said carrying member so that upon one and a half times of revolving movement of said carrying member, said one photosensitive sheet is positioned at said another fixed position while the other photosensitive sheet is positioned at said projection position, a developing means, a transfer means and an electrically charging means arranged along the movement path of said carrying member, and a fixing means, said developing means selectively functioning to develop the photosensitive sheet subjected to projection of said light spots and to remove the residual toners on the photosensitive sheet by application of electrical potential of desired polarity and of desired magnitude, and means for producing two copies of the recorded image for every three times of revolving movement of said carrying member.

4,003,652

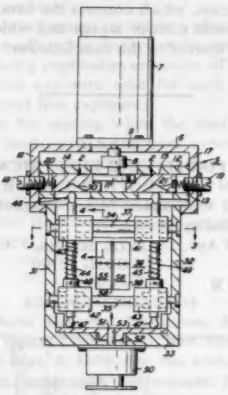
SHUTTER-OPENING PRESETTING MECHANISM FOR MOTION PICTURE COPYING APPARATUS

William H. Allen, Bellerose, and Dom Capano, Staten Island, both of N.Y., assignors to F & B/CECO Industries, Inc., New York, N.Y.

Filed Feb. 25, 1975, Ser. No. 552,818

Int. Cl.² G03B *9/42, 27/48, 27/78*

U.S. Cl. 355—71 **11 Claims**



1. Control mechanism for rapidly setting the width of opening between linearly movable opposed shutter halves, comprising: a rotatable cam having an eccentric circumferential surface of curvature, opposed slide members in yieldable contact with said circumferential surface at opposite sides thereof, whereby rotation of said cam effects relative movement of said slide members in opposite directions, each of said slide members having a V-shaped groove in a wall thereof, the apex of which groove is located substantially normal to the path of movement of the slide members; separate spaced apart slide blocks mounted for movement toward and away from each other in a path parallel to that of the aforesaid slide members, each of said slide blocks carrying a rod member for integral movement with its associated slide block each of said rod members also being movable relative to its associated slide block in a path normal to the path of movement of said slide block; each said rod member terminating in a ball-shaped forward end normally positioned at rest in an area defined by the width of the base of said V-shaped groove, and said end being normally spaced apart from the sloping walls of said groove; each of said slide blocks also having a shutter half integrally associated for movement therewith; means for rotating said cam through a predetermined distance to fix the position of said slide members and their associated V-shaped grooves; and separate operating means to move said rod mem-

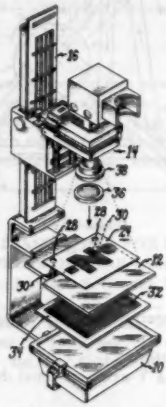
bers relative to their associated block members in a forward stroke to effect displacement of their ball-shaped ends from normal rest position and causing each such end to impinge upon a sloping wall of an adjacent V-shaped groove and to move along such wall to the apex of the groove, thereby moving its operatively associated slide block and shutter half to a position determined by the spacing between the apexes of the grooves, thus fixing the width of opening between said shutters.

4,003,653

METHOD OF PRODUCING COLOR SLIDES FROM BLACK AND WHITE ORIGINALS

James H. Kelly, II, Adams, Mass., assignor to General Electric Company

Filed Mar. 17, 1975, Ser. No. 558,677
Int. Cl.² G03B *27/32*
U.S. Cl. 355—77 **7 Claims**



1. A method of making a color slide from a black and white original comprising the steps of
   a. providing a positive and a negative of the black and white original
   b. placing said positive between a light box and a camera
   c. placing a color filter on the lens of said camera
   d. exposing a film frame in said camera to said positive
   e. removing said positive and placing said negative between said light box and said camera
   f. providing another color filter to said camera lens
   g. exposing the same film frame to said negative whereby a color slide is provided having one color of background and a second color of foreground.

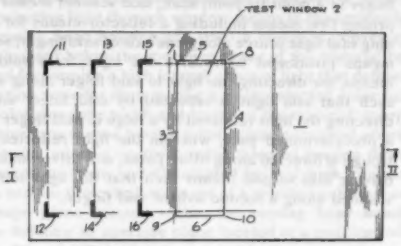
4,003,654

CONTACT PRINT TEST WINDOW

William G. Smolen, Jamaica, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed May 30, 1975, Ser. No. 582,074
Int. Cl.² G03B *27/28*
U.S. Cl. 355—125 **2 Claims**

1. A contact photoprint testing device, comprising a sheet of opaque material having a substantially rectangular window positioned in the center of said sheet, said window having four sides and four corners, said sheet having marks thereon indicating the positioning of an edge of a test print for placement over the window to expose different areas of the test print in succession, said marks comprising a plurality of pairs of corner indications at different distances from a pair of corners of the window whereby a test print is first positioned with the corners of one edge at the corner indications farthest from the window for exposure and is successively positioned at the indications closer to the window for exposure.

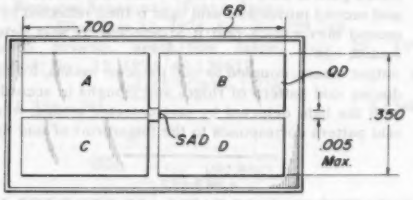


4,003,655

HYBRID SILICON AVALANCHE QUADRANT DETECTOR

Robert Wasilko, Belmar, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 17, 1975, Ser. No. 569,045
Int. Cl.² G01C *3/08;* **G01J** *1/20*
U.S. Cl. 356—4 **7 Claims**



1. An airborne laser tracker with a target ranging capability including an optical system having an optical axis and receptive of laser radiation from a target comprising: a first detector means disposed adjacent said optical axis for detecting radiation received by said optical system, said first detector means including spaced electrodes upon which a portion of said received radiation impinges, another portion of said received radiation passing through spaces between said electrodes; and second detector means for target ranging mounted in fixed relation with respect to said first detector means, said second detector means disposed behind said first detector means along said optical axis in substantial alignment with said first detector means for intercepting said another portion of said radiation for detecting radiation transmitted between electrodes of said first detector means, said second detector means having a sensitivity greater than that of said first detector means and an aperture smaller than that of said first detector means.

4,003,656

FINGERPRINT SCANNING DEVICE

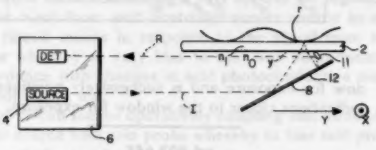
Stephen Richard Leventhal, Suite 506E, 7315 Wisconsin Ave., Bethesda, Md. 20014

Continuation-in-part of Ser. No. 359,008, May 10, 1973, Pat. No. 3,864,042. This application Oct. 7, 1974, Ser. No. 512,862
The portion of the term of this patent subsequent to Feb. 4, 1992, has been disclaimed.
Int. Cl.² G06K *9/08*
U.S. Cl. 356—71 **7 Claims**

1. A system for producing a pattern comprising ridges and troughs in accordance with a fingerprint of an individual's finger, said system comprising:

a. light source means;

b. scanner means for scanning said light source over said finger in a point-by-point scan, said scanner means comprising first means including a reflector means for scanning said light source along one axis of said finger; second means positioned to receive the light from said first means, for directing the light to said finger along a path such that said light is reflected by said finger and for directing the light reflected by a ridge in said finger along a predetermined path, wherein the light reflected by a trough is directed along other paths, and driver means for driving said second means such that the light source is scanned along a second axis of said finger;



c. detector means for detecting only the light from said light source means reflected along said predetermined path by said finger; and wherein said second means includes first and second mirrors positioned such that light from said first means is reflected by said first mirror towards said finger and light reflected by a ridge along said predetermined path is then reflected by said first mirror towards said second mirror and said light is then reflected by said second mirror such that it is detected by said detector means; and

e. output means, coupled to said detector means, for reproducing said pattern of ridges and troughs in accordance with the light detected by said detector means, wherein said pattern corresponds to the fingerprint of said finger.

4,003,657

ROTATING SUPPORT TABLE AND DRIVE FOR AN ECHELLE GRATING

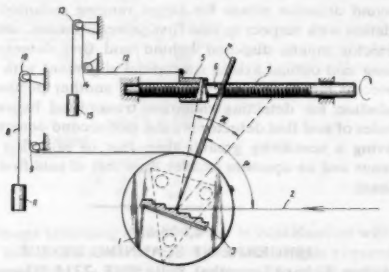
Rostislav Sovicka, Prague, Czechoslovakia, assignor to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Filed Apr. 7, 1975, Ser. No. 565,706

Claims priority, application Czechoslovakia, Apr. 9, 1974, 2543-74

Int. Cl.² G01J 3/12

U.S. Cl. 356—100 **7 Claims**



1. In an arrangement for the control of a diffraction grating wherein a light beam is directed to impinge on the grating; the improvement comprising a rotatable table having a substantially planar top surface, said diffraction grating being supported on said table, the lines of said grating being perpendicular to said top surface on said table, a control arm fixed to said table, a nut having a cam, said control arm being positioned to rest against said cam, a motion screw, the axis of said motion screw being parallel to said light beam at the point of impingement and pointing in a direction which does not intersect the center of rotation of the rotatable table, said nut being threaded on said screw, whereby rotation of said screw transmits a linear movement to said nut and cam.

4,003,658

TRIANGULAR INTERFEROMETRIC LIGHT-SOURCE TRACKER

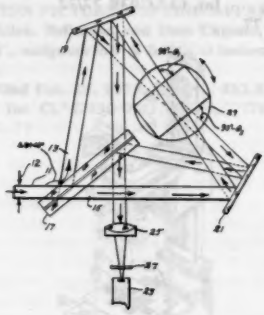
Dennis Kelsall, Concord, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed July 26, 1974, Ser. No. 492,093

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² G01B 9/02; G01D 21/04

U.S. Cl. 356—110 **5 Claims**



1. A triangular interferometric tracker of a source light comprising:

a. a gimballed platform;

b. an X-axis and a Y-axis rotational drive means for said platform;

c. means for providing a collimated beam from the light of said source;

d. means for splitting said beam to provide two beams;

e. means for rotating the wavefront of one of the two beams through ninety degrees in space;

f. a triangular interferometer mounted on said gimballed platform with the rotated and non-rotated beams being physically separated beam inputs thereto and with said interferometer producing two separate electrical output signals, said signals being the modulation transfer function of each of the beam inputs; and

g. means for producing signals from said two output signals suitable to actuate the X-axis and the Y-axis drive means to move said gimballed platform to cause said collimating means to track said source of light.

4,003,659

SINGLE PLANE CORNER REFLECTOR GUIDANCE SYSTEM

Robert G. Conard, Huntsville, Ala., and Kynric M. Pell, Laramie, Wyo., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

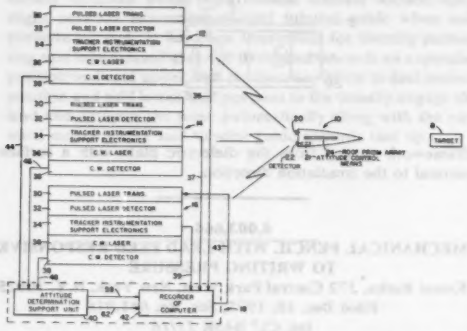
Filed Nov. 15, 1974, Ser. No. 524,287

Int. Cl.² G01B 11/26; F41G 7/00

U.S. Cl. 356—152 **4 Claims**

1. A method for detecting the attitude of a launched missile relative to a predetermined trajectory to a target comprising tracking said missile with a plurality of laser trackers to produce azimuth and elevation angles plus range data of said missile at each tracker location, said missile having an outer skin with a single plane roof prism array mounted therein along an axis that is generally longitudinal to an axis of the missile, illuminating said roof prism array on said missile with

a continuous wave laser of each of said plurality of laser trackers as said missile rotates said roof prism array into view of said continuous wave laser of each of said plurality of said laser trackers, detecting the reflections of each continuous wave laser of each of said laser trackers to enable the production of signals that are processed into yaw and pitch signals for the missile, and storing in storage means, as received data, the azimuth and elevation angles plus range data of said missile and the yaw and pitch signals from the detecting of the reflections received at each laser tracker location.



4,003,660

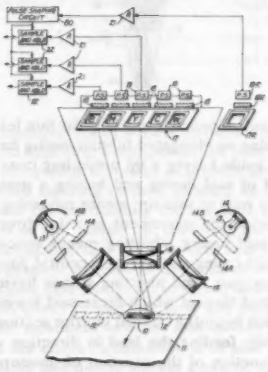
SENSING HEAD ASSEMBLY FOR MULTI-COLOR PRINTING PRESS ON-LINE DENSITOMETER

John S. Christie, Jr.; Richard S. Hunter, both of McLean, and S. Upton Jenkins, Fairfax, all of Va., assignors to Hunter Associates Laboratory, Inc., Fairfax, Va.

Filed Dec. 3, 1975, Ser. No. 637,391

Int. Cl.² G01J 3/50

U.S. Cl. 356—178 40 Claims



1. In a sensing head assembly for a multi-color printing press on-line densitometer comprising a sensing head housing movably mounted on support members extending across the width of a material being printed by a multi-color press together with means for traversing the sensing head housing back and forth across the width of the printed material and the material being printed having printed thereon a plurality of spaced-apart color bars extending across the width of the material at predetermined intervals along its length, the color bars comprising a plurality of aligned discrete areas each printed with an elemental color such that each color bar includes all of the elemental colors appearing on the material; the improvement comprising a multiplicity of high luminance lamps mounted within the sensing head housing adjacent respective reflectors for projecting light through window means in the underside of the sensing head housing and onto a common convergence point located below the specimen plane of the material being printed for forming a high intensity spot of light that defines an inspection zone for illuminating a single selected color bar at any point along the width and length of the material, receptor objective lens means having a maximum numerical aperture for viewing an area on the printed material passing through the inspection zone and illuminated by said high luminance lamps and for projecting an image of a selected color bar onto an image plane located within the sensing head housing, means defining an aperture plane located at a position below the best focused color bar image and having respective aperture openings therein corresponding in position to each discrete elemental color area comprising the color bar, and opto-electric conversion means comprising small area high impedance semiconductor photodetector cells positioned in back of the respective aperture openings and responsive primarily only to a respective elemental color light corresponding to the discrete elemental color area of the color bar being imaged through the respective aperture opening.

4,003,661

APPARATUS FOR DETECTING CONTAMINATION OF LIQUID

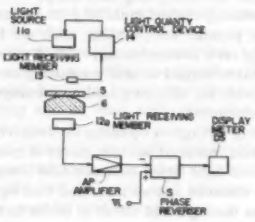
Shigemi Yamano, Isehara, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed July 23, 1975, Ser. No. 598,346

Claims priority, application Japan, July 26, 1974, 49-86364; Nov. 13, 1974, 49-130617

Int. Cl.² G01N 33/28

U.S. Cl. 356—201 5 Claims



1. In apparatus for detecting contamination of liquid of the type wherein light emanated by a luminous element is transmitted through a liquid sample and the quantity of the transmitted light is detected by a light receiving member, the improvement which comprises a pair of transparent members interposed between said luminous element and said light receiving member, at least one of said pair of transparent members being convex and in contact with the other at the top of the convex member thus forming therebetween a gap for accommodating a liquid sample.

4,003,662

PORTABLE PHOTOMETER

Erich Retzer, Maisach; Otto Holzinger, Munich, and Wilhelm Pross, Munich, all of Germany, assignors to Compur-Electronic Gesellschaft mit beschrankter Haftung, Munich, Germany

Filed May 21, 1975, Ser. No. 579,676

Claims priority, application Germany, June 4, 1974, 7419211

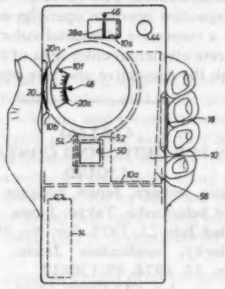
Int. Cl.³ G01N 21/24

U.S. Cl. 356—206 10 Claims

1. A portable photometer for measuring the light permeabil-

ity of a material for testing, said photometer being arranged within a casing sized and shaped for hand holding and manipulating, and said photometer comprising:

a. a battery power supply;
b. a lamp in circuit with said power supply;
c. means for establishing a path for a light beam from said lamp;
d. a manually operable switch for energizing said lamp, said switch being located and arranged for operation by fingers of a hand which holds and supports the photometer;
e. an electrical measuring circuit;
f. said measuring circuit including at least one light-sensitive element;
g. a wedge filter movably arranged in said path of said light beam;
h. a manually movable setting member arranged for positioning said wedge filter, said setting member being located and arranged for manual actuation by the same



hand which holds the photometer and which operates said switch for energizing said lamp;
i. said measuring circuit including an indicator instrument having a pointer cooperating with an index mark for indicating zero compensation of said measuring circuit;
j. an element arranged in said measuring circuit and manually operable for effecting said zero compensation before a test measurement;
k. said casing having an opening for receiving a cuvet containing said material so said cuvet is positioned in said path of said light beam between said lamp and said light-sensitive element and so arranged that light of said beam must pass through said cuvet in order to reach said light-sensitive element; and
l. a viewable scale movable by said setting member with movement of said wedge filter for displaying a directly readable test result value from adjustment of said wedge filter during measurement of said material.

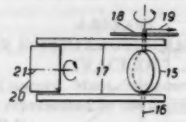
4,003,663

DEVICE FOR CALIBRATING INSTRUMENT THAT MEASURES CIRCULAR DICHROISM OR CIRCULARLY POLARIZED LUMINESCENCE

Izchak Zevi Steinberg, Rehovot, Israel, assignor to Yeda Research & Development Co., Ltd., Rohovath, Israel

Division of Ser. No. 490,660, July 22, 1974, which is a continuation-in-part of Ser. No. 224,706, Feb. 9, 1972, abandoned. This application Aug. 18, 1975, Ser. No. 605,329
Claims priority, application Israel, Feb. 26, 1971, 36297
Int. Cl.[3] G01V *1/04, 4/00;* G02B *5/30, 27/28*
U.S. Cl. 356—243 4 Claims

1. A device for calibrating an instrument having a main irradiation direction and by which circular dichroism or circularly polarized luminescence is measured comprising: a transparent dielectric plate rotatably mounted in a framework so as to be rotatable about an axis passing through the plate substantially normal to the main irradiation direction, means for indicating the angular position of the plate relative to its axis of rotation, and a quarter-wavelength plate mounted on the



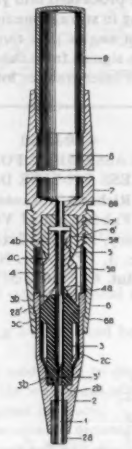
framework spaced from the dielectric plate with a surface normal to the irradiation direction.

4,003,664

MECHANICAL PENCIL WITH LEAD FEED RESPONSIVE TO WRITING PRESSURE

Kemal Butka, 372 Central Park West, New York, N.Y. 10025

Filed Dec. 18, 1975, Ser. No. 641,916
Int. Cl.[2] B43K *21/16*
U.S. Cl. 401—67 14 Claims



1. In a mechanical pencil, especially for thin leads, a combination comprising an elongated tubular casing having a lower end; a tubular guide having a tip projecting coaxially beyond said lower end of said casing and having a passage through which lead may pass to said tip; means mounting and guiding said tubular guide for movement in axial direction in said lower end of said casing; abutting means spaced from said lower end of said casing and having a central passage through which lead may pass, said abutting means having a contact surface at an end thereof which faces said lower end of said casing and which bounds a conical interior section; and means for automatically feeding the lead in direction outwardly of said tip as a function of the exertion of pressure on said tip during writing or drawing, said feeding means comprising a tubular, resilient element having upper and lower wall portions bounding a central channel coaxial with said central passage, said upper wall portions being movable between a normal position in which said central channel allows the lead from said central passage to pass therethrough and a clamping position in which said upper wall portions clamp the lead in said central channel, said lower wall portions frictionally engaging the lead in said central channel, said element further having an end adjacent said tubular guide and another conically shaped end which is adjacent said contact surface and which is configurated so as to be wedged in tight engagement within said conical interior section upon slight inward move-

ment of said tubular guide when pressure is exerted on said tip for thereby compressing said element and moving said upper wall portions towards said clamping position so as to tightly engage the lead in said central passage, and said conically shaped end being further configurated so as to be normally loosely received within said conical interior section upon slight outward movement of said tubular guide when said pressure on said tip has been terminated for thereby permitting said compressed element to expand towards an expanded position and said upper wall portions to return to said normal position and said lower wall portions to frictionally engage the lead and advance the same automatically along with the outward movement of said tubular guide towards said tip.

4,003,665

METHOD FOR THE MANUFACTURE OF WRITING INSTRUMENTS

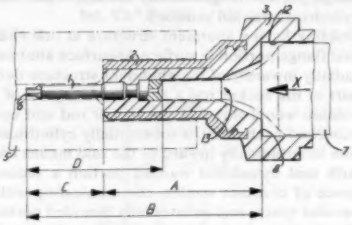
Hans Dreyer, Oberentfelden, and Roman Etter, Rombach, both of Switzerland, assignors to Kern & Co. AG, Aarau, Switzerland

Filed Mar. 20, 1975, Ser. No. 560,216

Claims priority, application Switzerland, Mar. 28, 1974, 4375/74

Int. Cl.² B32B *31/22*

U.S. Cl. 401—259 **14 Claims**



1. In the manufacture of writing instruments, the method of mounting and fastening a non-plastic ink tube in the bore of a plastic tip, comprising the steps of:providing said bore with a radially inward tapering surface forming an annular contact area with said tip, introducing the ink tube at least partially into the bore of said plastic tip, centering the ink tube within said bore, subjecting said ink tube and said plastic tip to ultransonic treatment at least in the area of contact with one another to cause said plastic tip to soften and to partially melt about the periphery of said ink tube and thereafter stopping the ultrasonic treatment to cause said molten plastic material to set about the entire circumference of said ink tube.

12. A writing instrument having a plastic tip with an axial bore and an ink tube therein and welded thereto, said instrument comprising an injection molded plastic tip with an annular peripheral supporting portion within its bore, a cleaning wire shiftable within the ink tube, attached to a controlling weight and protruding, at a given weight position, beyond the writing surface of the ink tube, said ink tube after insertion and centering within the plastic tip being fixed thereto by an ultrasonic treatment, the plastic material of a contact area of tip and tube softened and partially melted thereby facilitating a further axial insertion of the ink tube to a predetermined position with a low exertion of force only and the plastic material after the ultrasonic treatment solidifying and keeping the ink tube fixedly in its position.

4,003,666

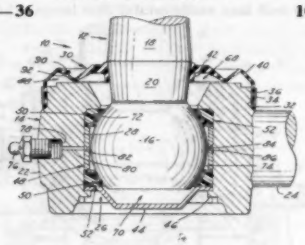
BALL JOINT ASSEMBLY

Donald R. Gaines, Farmington Hills; Jon M. Smallegan, Ann Arbor, and William H. Trudeau, Brighton, all of Mich., assignors to Gulf & Western Manufacturing Company, Southfield, Mich.

Filed May 21, 1976, Ser. No. 688,846

Int. Cl.² F16C *11/06*

U.S. Cl. 403—36 **10 Claims**



1. In a joint assembly with a socket member having an opening therethrough with a substantially cylindrical recess therein, a stud member with a ball received in said recess and a stud projecting therefrom through said opening to the exterior of said socket member, and a seal member of a flexible resilient material engaging both the stud and the socket member and at least in part defining a lubricant reservoir adjacent the ball, the improvement comprising a ring of a bearing material received in said recess of said socket member and encircling an equatorial area of said ball, a pair of separate wear rings of a high density plastic material with a low coefficient of friction received in said recess of said socket member adjacent opposed ends of said bearing ring and each surrounding an area of said ball between the equatorial area and one of the polar regions of said ball, load rings of a resilient material each interposed and compressed between one of said wear rings and said recess of said socket member and each urging one of said wear rings into engagement with said ball such that the joint assembly has wear take-up compensation, and both said bearing ring and at least said wear ring adjacent said sealing member each having at least two circumferentially spaced grooves extending generally axially thereacross and opening onto said ball to provide lubricating passages communicating with said ball and with said lubricant reservoir defined at least in part by said seal member.

4,003,667

LUBRICATABLE BALL JOINT ASSEMBLY

Donald R. Gaines, Farmington Hills; Jon M. Smallegan, Ann Arbor, and William H. Trudeau, Brighton, all of Mich., assignors to Gulf & Western Manufacturing Company, Southfield, Mich.

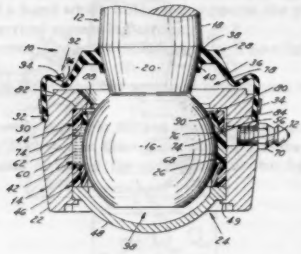
Filed May 21, 1976, Ser. No. 688,847

Int. Cl.² F16C *11/06*

U.S. Cl. 403—36 **10 Claims**

1. In a joint assembly with a socket member having an opening therethrough with a substantially cylindrical recess therein, a stud member with a ball received in said recess and a stud projecting therefrom through said opening to the exterior of said socket member, a bearing ring substantially coaxially received in said recess and surrounding a relatively large equatorial area of said ball between the polar regions thereof, said bearing ring having a sufficient thickness at its mid section to substantially fill the space in said recess between said ball and said socket member and having portions adjacent each edge of said ring spaced from said recess of said socket member, and load rings of a deformable expansible compressible material each received and compressed between one of said portions adjacent each edge of said bearing ring and said recess of said socket member to urge at least said edge por-

tions of said bearing ring into firm engagement with said ball, the improvement comprising a seal member of a flexible resilient material engaging both said stud and said socket member and both providing a seal therebetween and at least in part defining a lubricant reservoir adjacent said ball, at least one groove extending generally axially across the one load ring adjacent said lubricant reservoir and defining at least in part a



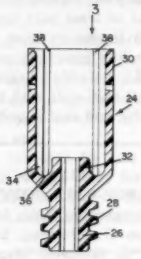
grease passage communicating with said lubricant reservoir, and a grease fitting carried by said socket member and communicating with said passage defined at least in part by said groove extending axially across said one load ring such that grease entering said grease fitting under sufficient pressure can flow through said passage defined at least in part by said groove in said one load ring and into said lubricant reservoir.

4,003,668

THREADED BROOM POLE ADAPTER

J. Joseph Kelly, III, West Boylston, and Galen Bruso, Lancaster, both of Mass., assignors to Clinton Plastics, Inc., Clinton, Mass.

Filed June 18, 1975, Ser. No. 587,811
Int. Cl.² B25G *3/30*
U.S. Cl. 403—287 **2 Claims**



1. A plastic adapter for connecting a handle with respect to a head wherein the head is provided with a recess,

interengaging means between the adapter and the head for securing the adapter to the head,

said adapter including a socket extending away from the interconnecting means thereon, said socket receiving the proximate end of the handle,

an abutment means integral with the adapter at the bottom portion of the socket and extending into the socket for spacing the latter from the proximate end of the handle,

and means on the interior side walls of the socket spacing the latter from the proximate end portion of the handle,

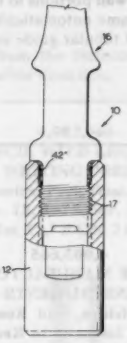
said abutment means extends inwardly of the socket from the bottom thereof and is spaced about its periphery from the interior wall of said socket and connected thereto by a concave inner wall defining said bottom with the concavity thereof facing the open end of said socket.

4,003,669

ANTI-CORROSIVE INSERT FOR SUCKER ROD COUPLINGS

Edward F. Fenske, 16 Village Court, Sherwood Park, Alberta, and Robert P. Smith, 2064 Obeck Crescent, Mississauga, Ontario, both of Canada

Filed Jan. 27, 1975, Ser. No. 544,232
Claims priority, application Canada, July 26, 1974, 205716
Int. Cl.² F16B *7/18*
U.S. Cl. 403—288 **9 Claims**



1. In combination:

a sucker rod for an oil well, the sucker rod having at one end an externally threaded portion, a substantially cylindrical waisted portion longitudinally adjacent and inward of the threaded portion and a radially outwardly extending flange portion longitudinally inward of the substantially cylindrical waisted portion;

a coupling having abutment structure at one end engaging said flange portion in surface-to-surface abutment, means radially inwardly of the abutment structure defining with part of the sucker rod a first annular space of which the volume would shrink if the sucker rod and coupling approached each other, a substantially cylindrical wall portion longitudinally inward of the said means and defining with said cylindrical waisted portion a second annular space of constant section communicating with said first annular space, and an internally threaded portion longitudinally inward of said substantially cylindrical wall portion, said internally threaded portion being in threaded engagement with said externally threaded portion;

and an integral sealing insert of resilient material inert to the oil well environment, the insert being preformed to have a substantially tubular portion contained in said second annular space and having, at one end of the tubular portion, a flared portion contained in said first annular space in gasket sealing relationship therewith, the tubular portion being of appreciably greater mass than the flared portion and lending to the flared portion a greater stability and resistance to distortion than the flared portion would by itself possess.

4,003,670

BLOCK BORING TOOL

H. Richard Ewing, Rte. 4, Box 31A, Titusville, Pa. 16354

Filed Oct. 24, 1975, Ser. No. 625,580
Int. Cl.² B23B *29/034*
U.S. Cl. 408—185 **12 Claims**

1. A holder for a cutting tool bit comprising

an elongated block adapted to be supported on a boring bar,

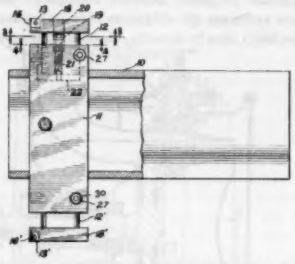
an elongated tang,

cutting tool means on said tang,

said tang being generally rectangular in cross section,

a bore in said block defined by at least two side surfaces and at least one edge surface enclosing a space generally complementary in shape to said tang,

said tang being received in said bore and having at least two side surfaces and at least one edge surface parallel to and slideably engaging said side surfaces and edge surface respectively defining said bore in said block,



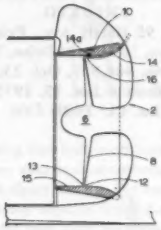
wedge means on said block engaging a flat surface adjacent said side surface and edge surface on said tang for clamping said tang in said block in selected positions relative to said block.

4,003,671

METHOD AND MEANS TO PREVENT CAVITATION EROSION IN PROPELLER DUCTS

Erling Huse, Vikhamar, and Knut Minsaas, Trondheim, both of Norway, assignors to Norges Skipsforskningsinstitutt, Trondheim, Norway

Filed Nov. 26, 1974, Ser. No. 527,423
Claims priority, application Norway, Dec. 4, 1973, 4625/73
Int. Cl.² B63H *11/02*
U.S. Cl. 415—1 **10 Claims**



1. A method for preventing erosion of a ship propeller duct, wherein propeller blade tips rotate adjacent a surface of said duct with the resultant formation of gap cavities therebetween, said method comprising:

supplying air to said gap cavities between said propeller blade tips and said duct surface, by passing air through at least one tube fixed to the inner surface of said duct.

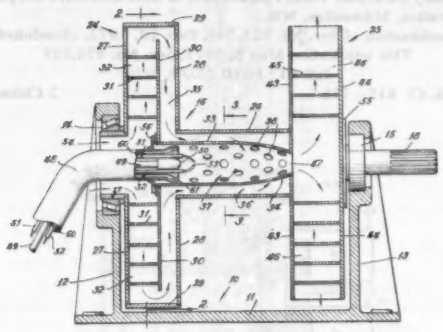
4,003,672

INTERNAL COMBUSTION ENGINE HAVING COAXIALLY MOUNTED COMPRESSOR, COMBUSTION CHAMBER, AND TURBINE

Joseph A. Gamell, Kalamazoo, Mich., assignor to Joseph Gamell Industries, Incorporated, Kalamazoo, Mich.

Division of Ser. No. 401,206, Sept. 27, 1973, Pat. No. 3,886,732. This application Feb. 26, 1975, Ser. No. 553,281
Int. Cl.² F01D *5/00*
U.S. Cl. 415—71 **4 Claims**

1. A compressor adapted for use in an internal combustion engine comprising an axially disposed, tubular housing, a first outer radial wall having an axial inlet therein, a second outer radial wall affixed to and projecting radially from one end of said housing and having an axial outlet communicating directly with said housing, a peripheral axial wall connecting said first and second outer radial walls and forming therewith a cylinder which is concentric with said housing, but which has a substantially larger diameter, and an inner radial wall mounted intermediate said first and second outer radial walls and of smaller diameter than said outer radial walls, whereby the periphery thereof is uniformly spaced from said peripheral axial wall, and a spiral web intermediate said first outer wall



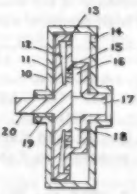
and said inner wall having its edges affixed to said walls, cooperating to define a spiral chamber, said inner radial wall and said second outer radial wall cooperating to define a radial duct communicating with said housing through said axial outlet, and said spiral chamber communicating at its innermost end with said inlet and at its outermost end with said radial duct, the sole communication between said inlet and said housing being through said spiral chamber, said radial duct, and said axial outlet, and bearing means for supporting said compressor for rotation about its axis.

4,003,673

FLUID PRESSURIZER

Michael Eskeli, 7994-41 Locke Lee, Houston, Tex. 77042

Continuation-in-part of Ser. No. 386,273, Aug. 7, 1973, Pat. No. 3,758,223, and a continuation-in-part of Ser. No. 185,060, Sept. 30, 1971, Pat. No. 3,879,152. This application Apr. 17, 1975, Ser. No. 568,895
Int. Cl.² F01D *1/18*
U.S. Cl. 415—80 **3 Claims**



1. A fluid pressurizer comprising a shaft mounted for rotation, a rotor mounted on said shaft so as to rotate therewith, a casing enclosing the rotor said rotor having an entry for a fluid to be pressurized near its center, said rotor having a first cavity concentric with said shaft communicating with said entry for passage of said fluid and having a set of vanes, said first cavity having a set of feeder nozzles for discharging said fluid in a direction that is forwardly and in the direction of rotation into a second cavity, said second cavity being a radially outward cavity concentric with said shaft, said fluid being pressurized within said second cavity by centrifugal force acting on said fluid, said fluid being then discharged from said second cavity

into the casing through a set of exit openings located near to the outer radius of said second cavity, said fluid pressurizer having an outlet through which the fluid in the casing may flow from the pressurizer.

4,003,674

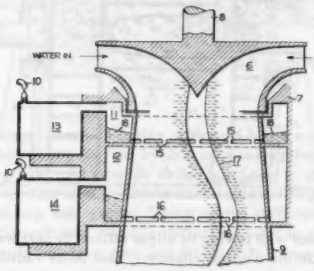
HYDRAULIC TURBINE DRAFT TUBE PRESSURE STABILIZER

Ignacy Swiecicki, York, Pa., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Continuation of Ser. No. 423,544, Dec. 10, 1973, abandoned. This application May 5, 1975, Ser. No. 574,527

Int. Cl.² F01D *25/30, 5/10*

U.S. Cl. 415—116 **2 Claims**



1. In a hydraulic turbine having a casing to permit the flow of water therethrough, a runner mounted for rotation within said casing and a draft tube connected to said casing downstream from said runner and having high and low water pressures therein, the improvement comprising:

an air chamber positioned about said draft tube;

a plurality of circumferentially spaced openings connecting the interior of said draft tube to said air chamber; and

a source of pressurized air connected to said air chamber, means for maintaining the pressure of said air greater than the pressure of said water in the low pressure areas of said draft tube where the air enters said draft tube and less than the pressure of said water in the high pressure areas of said draft tube where the water enters said air chamber, said openings being located adjacent the lower end of said chamber whereby the vertical space above said openings in said chamber is sufficient to permit the draft tube water to rise therein until the sum of the air pressure and the pressure of the water head in said chamber is equal to the high pressure water in said draft tube.

4,003,675

ACTUATING MECHANISM FOR GAS TURBINE ENGINE NOZZLES

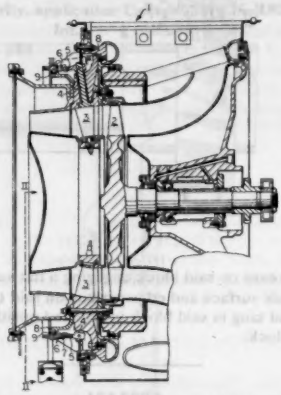
Wallace Gene Stevens, Dunlap, and Karl Wilfred Karstensen, Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Sept. 2, 1975, Ser. No. 609,764

Int. Cl.² F01D *17/12*

U.S. Cl. 415—150 **5 Claims**

1. A movable vane assembly of the type used in a gas turbine engine or compressor for interaction with a gas stream comprising: a plurality of radially aligned vanes circumferentially arranged within an annular passage formed by a first housing, said vanes being supported for rotation about their radial axes to vary the effective cross sectional area of said annular passage, a plurality of rotatable gear means connected for rotation with said plurality of aligned vanes, a ring gear having teeth means adapted for simultaneous engagement with the teeth means of said plurality of rotatable gear means such that rotation of the ring gear causes rotation of said plurality of vanes, actuating means for selectively rotating said ring gear, said actuation means including first and second link means connected at first and second diametrically opposed points on the periphery of said ring gear, and first motor means for simultaneously actuating said first and second links to rotate said ring gear, said actuating means further including



first and second bell crank means connected between said first and second links and said first motor means, first lever means connected by rod means for movement with said fluid motor, said first lever means being fixed for rotation upon a first shaft, and second lever means also fixed for rotation upon said first shaft and connected for movement with said link means.

4,003,676

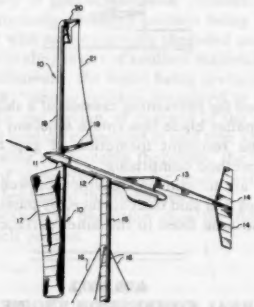
WINDMILL BLADE AND PROCESSES RELATED THERETO

Thomas E. Sweeney, 95 Hartly Ave., Princeton, N.J. 08540, and Walter B. Nixon, 30 Merritt Drive, Trenton, N.J. 08638

Division of Ser. No. 408,837, Oct. 23, 1973, Pat. No. 3,874,816. This application Jan. 15, 1975, Ser. No. 541,248

Int. Cl.² F03D *7/00*

U.S. Cl. 416—132 B **8 Claims**



1. A windmill blade comprising a rigid leading edge portion, said rigid leding edge portion having a side positioned to not be exposed to the oncoming ambient wind, a rigid root portion connected to said rigid leading edge portion, a rotatable tip member rotatably connected to the outer end portion of said rigid leading edge portion, said rotatable tip member having a side positioned to not be exposed to the oncoming ambient wind, a rigid link member having two ends with one end thereof operatively connected to the side of said rigid leading edge portion which is positioned not to be exposed to the oncoming ambient wind and the opposite end thereof opera-

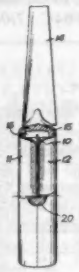
tively connected to the side of said rotatable tip member which is positioned to not be exposed to the oncoming ambient wind, said rigid link member having a length to give the proper blade tip member angle and hence blade twist for the best performance under the expected ambient wind conditions, and an elongated flexible member having one end thereof connected to said rotatable tip member and the other end thereof connected to the aft end of said rigid root portion.

4,003,677

FAN ASSEMBLY WITH BLADES SECURED BETWEEN TWO HUB MEMBERS

George Robertson Parkes, Streetly, England, assignor to Wilmot Breeden (Trufio) Limited, England

Filed May 2, 1974, Ser. No. 466,454
Claims priority, application United Kingdom, May 7, 1973, 21679/73
Int. Cl.² F04D 29/34
U.S. Cl. 416—208 4 Claims



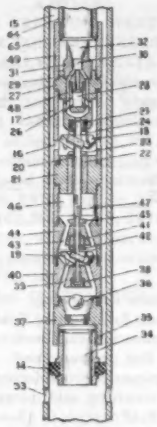
1. A fan comprising two hub members; a flat plate member sandwiched between said hub members; at least two blades, each blade having a short stem at the root thereof with a boss on the end of the stem remote from the blade which boss is secured between said two hub members, each hub member being semi-circularly notched to fit around said stem and each boss being of circular cross-section transverse to the axis of the boss, said axis being a radial axis of the fan, each boss further including a diametral groove formed in the boss at the root end of each blade for partially straddling the periphery of said plate member, each boss being smoothly curved in its longitudinal section with its maximum diameter intermediate its ends, the side surface of the boss merging smoothly into the end surface nearer the blade, which end surface is a portion of a spherical surface whose radius of curvature is equal to the distance of that surface from the center point of said flat plate member; and means securing said two hub members and plate together with said hub members at least partially embracing said bosses and with their outer peripheries adjacent one another in a diametral plane in the regions between said blades whereby said blades are held onto said plate; said hub members being of the same uniform shape in all radial planes to conform to and fit around the side and top of each boss, the peripheral portions of said hub members being smoothly curved in a plane transverse to said radial planes and containing said center point so as closely to embrace the spherical end surface of the boss on each of said blades; and the radially outermost portions of said hub members extending inwardly towards one another over part of the end surfaces of the boss adjacent the root of the fan blade.

4,003,678

FLUID OPERATED WELL TURBOPUMP

Ed B. David, Benton, Ark., assignor to E M C Energies, Inc., Casper, Wyo.

Filed Feb. 10, 1975, Ser. No. 548,860
Int. Cl.² F04B 23/04
U.S. Cl. 417—88 9 Claims



1. A fluid operated oil well turbopump adapted for connection to the bottom hole end of the tubing of an oil well and for operation by means of pressurized driving fluid circulating from an above-ground source through a path which includes the tubing and an annular space between the tubing and a casing of the well, said turbopump comprising:

an upper driving turbine and an axially spaced lower driven pump, each including a housing containing a revoluble impeller,

a drive shaft extending coaxially through each of said impellers, said drive shaft having a solid portion secured to the pump impeller and a coextensive tubular portion secured to and extending beyond the turbine impeller, the solid portion merging with the tubular portion at a junction located between said impellers,

said tubular portion being closed at the junction end and open at the other end and having a plurality of peripherally spaced intake openings extending through the wall of said tubular portion at a location spatially adjacent to said junction,

the bore of said tubular portion defining a production fluid conduit extending through said turbine impeller from the intake openings to the open outlet end thereof,

a production fluid inlet at the lower end of said pump,

a production fluid intake channel effective for directing production fluid from said inlet to said pump impeller,

a production fluid discharge channel extending upwardly from said pump impeller to the connection of the turbopump to said well tubing above said turbine impeller,

said discharge channel including the tubular portion of said drive shaft,

circumferentially spaced slotted driving fluid inlet openings in said turbine housing effective for directing pressurized fluid from said annular space to impingement on said turbine impeller, and

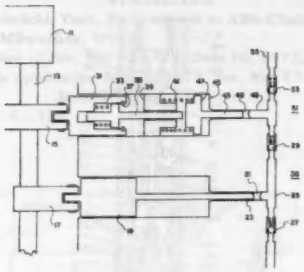
a spent driving fluid passageway in communication with said turbine housing effective for directing spent driving fluid upwardly into said well tubing.

4,003,679

HIGH PRESSURE PUMP WITH METERING

Douglass McManigill, Menlo Park, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 2, 1975, Ser. No. 564,246
Int. Cl.² F04B *3/00, 9/08*
U.S. Cl. 417—246 **11 Claims**



1. A pumping system comprising:

first pumping means for metering fluid charges of a desired volume and delivering said metered charges against a predetermined first pressure; and

second pumping means interconnected with said first pumping means for receiving said metered fluid charges and delivering said fluid charges to a load at a second pressure higher than said first pressure;

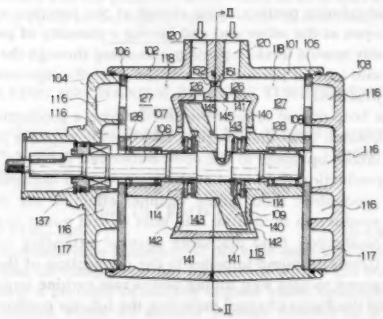
said second pumping means including pressure establishing means for providing said predetermined first pressure against which said first pumping means delivers said metered charges and insuring that no charge is drawn into said second pumping means by action of said second pumping means.

4,003,680

SWASH-PLATE COMPRESSOR

Shozo Nakayama; Kimio Kato, both of Kariya, and Sigeru Suzuki, Nishio, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, Japan

Filed Apr. 22, 1975, Ser. No. 570,317
Claims priority, application Japan, May 15, 1974, 49-55977
Int. Cl.² F04B *1/12;* **F01M** *1/00;* **F04B** *21/00*
U.S. Cl. 417—269 **1 Claim**



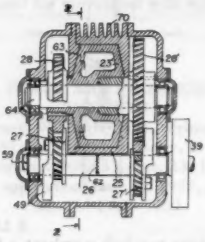
1. In a swash-plate type compressor of the type having a pair of horizontal axially aligned cylinder blocks forming a combined block which is provided with an inlet port in each block for introducing a refrigerant gas having oil particles suspended therein from the exterior of the compressor into each block, a pair of oil separating passageways communicating with each port respectively and extending in opposite axial directions of the combined block for separating the oil particles from the introduced refrigerant gas, means defining a lubricating oil reservoir and a swash-plate chamber in the middle portion of said combined block for rotatably supporting a swash-plate which is mounted on a drive shaft and causes reciprocal motions of compressor pistons slidably retained in aligned cylinder bores of said combined block, a pair of cylinder heads positioned at opposite ends of said combined block, each said head having a suction chamber connected to each of said oil passageways and valve plates interposed between said cylinder heads and said cylinder blocks, the improvement comprising a single fluid conduit for communicating each of said inlet ports with said lubricating oil reservoir, one end of said fluid conduit opening into the top of said reservoir above the level of lubrication oil stored in said reservoir and the other end of said fluid conduit is provided with oppositely directed ports each of which meets at right angles with the flow of refrigerant gas from each inlet port respectively whereby foaming lubricating oil generated in said reservoir upon starting said compressor is sucked into said refrigerant gas passing through said inlet ports, said fluid conduit being a groove located at the joining surface of said cylinder blocks.

4,003,681

POSITIVE-DISPLACEMENT UNIT WITH COAXIAL ROTORS

Ernest Wildhaber, 124 Summit Drive, Rochester, N.Y. 14620

Filed Feb. 20, 1975, Ser. No. 551,102
Int. Cl.² F01C *1/00;* **F04C** *17/00;* **F16H** *35/02, 55/04*
U.S. Cl. 418—36 **10 Claims**



1. A rotary positive displacement unit having two coaxial rotors whose arms project outwardly from their axis inside of a housing,

a shaft offset from the rotor axis for transmission of motion between said rotors and the outside,

a pair of varying-motion gears between said shaft and one of said rotors, another pair of varying-motion gears of opposite phase connecting said shaft with the other rotor, to achieve spaces of varying volume between said arms,

wherein the gear on the rotor of each of said pairs has twice as many teeth as the mating gear on said offset shaft,

said mating gear has beeth arranged in a circle eccentric of its axis of rotation while its pitch lines, that roll on the mate without slippage, have a varying distance from said circle.

4,003,682

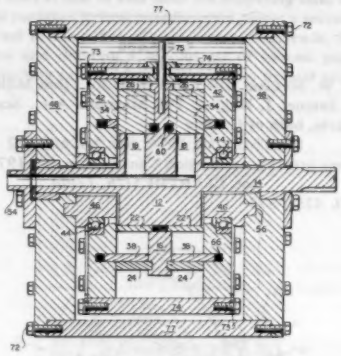
ROTARY PISTON ENGINE HAVING CONTINUOUS TORQUE CHARACTERISTICS

John William Stein, 5 Falcon Road, Flanders, N.J. 07836

Filed July 14, 1975, Ser. No. 595,393
Int. Cl.² F01C *19/00, 1/00;* **F04C** *1/00*
U.S. Cl. 418—107 **5 Claims**

1. In a rotary machine of the type having inner and outer concentric rings disposed about a first axis and an intermediate ring disposed about a second offset axis for rotation therewith in which said intermediate ring makes a rolling contact

seal with both said inner and outer rings to define a plurality of crescent-shaped chambers of varying volume therebetween, the improvement comprising means for adjustably moving said second axis relative to said first axis along an arcuate path constituted by an arc of a circle having its center



on the outside surface of said inner concentric ring and having a radius extending from said center through said first axis to said second axis, whereby frictional wear between said rings is compensated and the maintenance of said rolling contact seal is ensured.

4,003,683

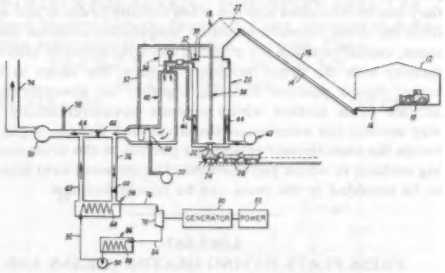
APPARATUS FOR PYROLYTIC TREATMENT OF SOLID WASTE MATERIALS TO FORM CERAMIC PRILLS

Orlo A. Powell, Jr., Wethersfield, and Angelo J. Roncari, East Granby, both of Conn., assignors to Urban Research & Development Corporation, East Granby, Conn.

Division of Ser. No. 542,027, Jan. 16, 1975, which is a division of Ser. No. 321,449, Jan. 5, 1973, Pat. No. 3,926,582. This application Feb. 23, 1976, Ser. No. 660,726

Int. Cl.² B22D *23/08*; C10B *1/00*

U.S. Cl. 425—6 **9 Claims**



1. Apparatus for disposing of solid waste comprising:

A. a reactor having a shell providing a substantially vertical pyrolysis chamber, a charging inlet and a gas outlet in the upper region thereof and a liquid outlet in the lower region thereof;

B. means for charging solid waste material having organic and inorganic components through said charging inlet;

C. gas-feed means for charging an oxygen-rich gas into said chamber under pressure at a plurality of vertically spaced points along the length thereof so as to produce combustion of the waste organic components and generate heat;

D. means for controlling the charging of the oxygen-rich gas at each of said plurality of vertically spaced points to maintain a plurality of different temperature zones along the length of said chamber so as to effect incomplete combustion of the waste organic component and form a combustible gas and an organic-free molten refractory material whereby the combustible gas is removed through said gas outlet and the molten refractory material is removed through said solids outlet; and

E. prilling means in communication with said solids outlet for prilling the molten refractory material.

4,003,684

APPARATUS FOR TREATING WEBS OF FILTERING MATERIAL FOR TOBACCO PRODUCT FILTERS, PARTICULARLY CIGARETTE FILTERS

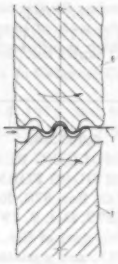
Paul Adolf Muller, Triesenberg, Liechtenstein, and Hans Muster, Hadlikon-Hinwil, Switzerland, assignors to Celfil Company Establishment, Vaduz, Liechtenstein

Continuation-in-part of Ser. No. 161,366, July 8, 1971, Pat. No. 3,849,526, and a continuation-in-part of Ser. No. 358,472, May 9, 1973, abandoned, and a continuation-in-part of Ser. No. 420,095, Nov. 29, 1973, Pat. No. 3,930,135, which is a division of Ser. No. 161,366, July 8, 1971, abandoned. This application Oct. 9, 1974, Ser. No. 513,430

Claims priority, application Switzerland, May 10, 1972, 6918/72; May 13, 1971, 7064/71

Int. Cl.² D01D *5/20*

U.S. Cl. 425—76 **10 Claims**



1. Apparatus for treating an elongated web of fibrous material to render the same particularly adapted to be gathered transversely and enclosed in a wrapper to make a filter cord subdividable into filter rods and filter plugs for cigarettes, comprising:

a first group of a pair of meshing rotating rolls provided with narrow longitudinal grooves alternating with narrow longitudinal ribs, said grooves and ribs being parallel to the axes of said rolls, said ribs being adapted to engage a web of fibrous material passed through the bight between said rolls and to prevent appreciable longitudinal contraction of the web so that the latter is stretched longitudinally in closely-spaced successive narrow transverse areas to loosen and expose fibers in such areas without substantial impairment of the longitudinal continuity of the web;

a second group of meshing rotating rolls provided with narrow circumferential grooves alternating with narrow circumferential ribs adapted to engage a web of fibrous material passed through the bight between said rolls and to prevent appreciable lateral contraction of the web so that the web is grooved in a direction parallel to its travel and stretched transversely of the grooves in a plurality of closely-spaced narrow longitudinal areas to loosen and expose fibers in such areas without substantial impairment of the transverse continuity of the web; and

means for advancing a web of fibrous material successively through the bights between the rolls of said first and second group.

8. A plant for producing wrapped filter rods containing a filter of fibrous material, consisting of an apparatus for treating an elongated web of fibrous material to render the same particularly adapted to be gathered transversely and of a rod

making machine for enclosing the gathered web in a wrapper to make a filter cord subdivided into filter rods for making filter plugs for cigarettes, comprising:

a first group of a pair of meshing rotating rolls provided with narrow longitudinal grooves alternating with narrow longitudinal ribs, said grooves and ribs being parallel to the axes of said rolls, said ribs being adapted to engage a web of fibrous material passed through the bight between said rolls and to prevent appreciable longitudinal contraction of the web so that the latter is stretched longitudinally in closely-spaced successive narrow transverse areas to loosen and expose fibers in such areas without substantial impairment of the longitudinal continuity of the web;

a second group of meshing rotating rolls provided with narrow circumferential grooves alternating with narrow circumferential ribs adapted to engage a web of fibrous material passed through the bight between said rolls and to prevent appreciable lateral contraction of the web so that the web is grooved in a direction parallel to its travel and stretched transversely of the grooves in a plurality of closely-spaced narrow longitudinal areas to loosen and expose fibers in such areas without substantial impairment of the transverse continuity of the web; and

means for advancing a web of fibrous material successively through the bights between the rolls of said first and second group including a common adjustable driving assembly for one of the group of rolls and an adjustable speed adjusting member for the other group of rolls, and

a tension gauge on the web of material entering the rod making machine which is influencing the said adjustable driving assembly.

4,003,685

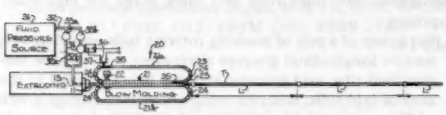
APPARATUS FOR MOLDING PLASTIC PIPE WITH ENLARGED PORTIONS FORMED THEREIN

Ernest J. Maroschak, P.O. Box 878, Roseboro, N.C. 28382

Division of Ser. No. 513,279, Oct. 9, 1974, Pat. No. 3,919,367, which is a continuation-in-part of Ser. No. 271,225, July 13, 1972, Pat. No. 3,891,733, and a continuation-in-part of Ser. No. 316,825, Dec. 20, 1972, Pat. No. 3,859,025. This application June 13, 1975, Ser. No. 586,737

Int. Cl.² B29D *23/03*

U.S. Cl. 425—135 **9 Claims**



1. In a blow molding apparatus for molding a plastic tube having spaced apart enlarged sleeve portions formed therein along its length, said apparatus including an extruder for continuously extruding hot plastic material in the form of a tube, an endless series of cooperating pairs of forwardly moving die blocks defining a blow molding zone for receiving and molding the tube of hot plastic material, most of the cooperating pairs of die blocks being body-forming die blocks having concave inner surfaces defining a body-forming mold cavity for molding the tube into body portions of predetermined tubular dimension, at least one of the cooperating pairs of die blocks being sleeve-forming die blocks having concave inner surface portions of larger internal dimension than the inner surfaces of said body-forming die blocks and defining an enlarged mold cavity for molding enlarged sleeve portions in the tube between adjacent body portions, and means for supplying internal fluid pressure in the hot plastic tube during forward movement of the same through said blow molding zone to expand and mold the hot tube against said body-forming and sleeve-forming mold cavities, the improvement comprising means for automatically effecting lowering of the internal fluid pressure in the hot plastic tube for a short period of time each time said enlarged sleeve-forming mold cavity is in a predetermined location during molding of the tube therein to thereby avoid blowing holes in the hot plastic tube as the hot tube is stretched and expanded to conform with the enlarged sleeve-forming mold cavity and form enlarged portions in the tube.

4,003,686

MOULDING PRESS

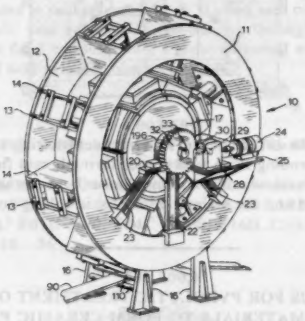
Cedric W. McLeod, 1065 Don Mills Rd., Don Mills, Ontario, and Samuel J. Hughes, 198 Magnolia Ave., Scarborough, Ontario, both of Canada

Filed Mar. 18, 1976, Ser. No. 668,122

Claims priority, application Canada, Dec. 24, 1975, 242559

Int. Cl.² B29H *5/28, 17/00*

U.S. Cl. 425—373 **12 Claims**



1. A press for moulding strip material, comprising a drum having an exterior circumferential moulding surface on which the strip material is to be applied, the drum moulding surface being formed with a contoured moulding profile for moulding the strip material with corresponding contours when it is pressed onto the drum, a stationary frame extending around the drum moulding surface, means rotatably mounting said drum on said frame for rotation about its axis, a plurality of press shoes being supported on said frame by means whereby they can be extended and retracted radially towards and away from the drum between an outer, inoperative position and an inner, closed position for pressing the strip material into conformity with the drum moulding surface, the shoes in their inner, closed position forming together an inwardly-facing arcuate press surface which extends circumferentially part way around the exterior of the drum and defines a gap between the ends thereof exposing a portion of the drum moulding surface, in which gap portions of continuous strip material to be moulded in the press can be accommodated.

4,003,687

PRESS PLATE HAVING HEATING MEANS AND ADAPTED FOR USE IN SINGLE-STOREY OR MULTI-STOREY PRESSES FOR THE MANUFACTURE OF FIBREBOARD, CHIPBOARD, LAMINARBOARD AND THE LIKE

Borje Vilhelm Hedin, Motala, Sweden, assignor to Aktiebolaget Motala Verkstad, Motala, Sweden

Filed June 9, 1975, Ser. No. 584,883

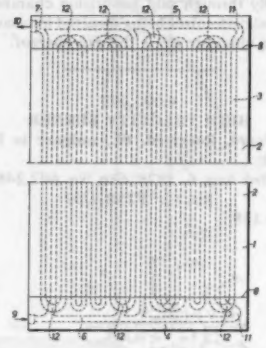
Claims priority, application Sweden, June 13, 1974, 7407832

Int. Cl.² B30B *15/06;* **B29J** *5/08*

U.S. Cl. 425—406 **7 Claims**

1. A press plate adapted to be heated to a generally uniform temperature for use with presses to manufacture board-like members, comprising: an elongated expansive center section having longitudinally opposed ends and spaced sides and defining a plurality of only longitudinal fluid-flow passages

spaced generally in parallel relationship to each other for passage of a heating fluid between said ends to heat said press plate; a first end piece secured to one of said longitudinal ends, having spaced sides and defining a first set of looped passages fluidly connecting said longitudinal passages and defining an inlet at one of said sides for supplying fluid to said longitudinal passages to heat said first end piece; a second end piece secured to the other of said longitudinal ends, having spaced sides and defining a second set of looped passages fluidly connecting said longitudinal passages to heat said sec-



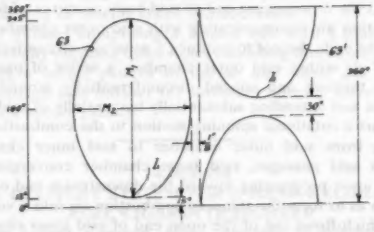
ond end piece; and one of said end pieces defining an outlet for spent fluid passing through said longitudinal passages; and wherein said first end piece has a first corner at the side thereof opposite said inlet and defines a first curved fluid-flow passageway in flow communication with said longitudinal passages and adjacent said first corner to heat said first corner, and said second end-piece has a second corner at the side thereof longitudinally opposite said first corner and defines a second curved fluid-flow passageway in flow communication with said longitudinal passages and adjacent said second corner to heat said second corner.

4,003,688

REVOLVING CYLINDRICAL ESCAPEMENT EXTRUSION APPARATUS FOR SHAPING FOODSTUFF ARTICLES

Eberhard Mueller-Lobeck, Stamford, Conn., assignor to Automation International Corporation, Norwalk, Conn.

Filed Dec. 26, 1974, Ser. No. 536,346
Int. Cl.² B29C *23/00*
U.S. Cl. 425—465 **17 Claims**



1. Revolving cylinder escapement extrusion apparatus for forming an extrudable material into product blanks, such as blanks of dough for pancakes, pie crusts, tortillas, pizza rounds, crispy deep-fried articles and for forming blanks of other extrudable foodstuff material for making other food products, said extrusion apparatus comprising:

nozzle means forming an elongated narrow orifice slot,

feed means for feeding the extrudable material to said nozzle means under pressure for extruding the material through the orifice slot,

a cylindrical escapement member having a cylindrical peripheral surface containing a plurality of axially spaced openings, said openings having sharp edges at the peripheral surface of said escapement member,

mounting means for revolvably mounting said cylindrical escapement member at the outside downstream end of said nozzle means adjacent to said orifice slot and with the axis of said cylindrical member extending parallel with said elongated orifice slot,

drive means for revolving said cylindrical member for moving the peripheral surface containing said openings past said orifice slot for controlling extrusion of the material from the orifice slot and for shaping said extruded material into product blanks as the respective cavities of said escapement member revolve past said orifice slot, and

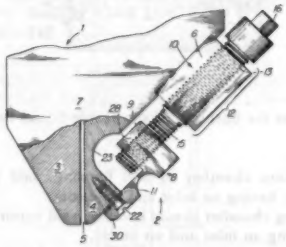
said axially spaced openings being angularly displaced about the axis of said escapement member and overlapping each other in the circumferential direction so that as the revolving escapement member is diminishing the flow of the material being shaped by the sharp edges of one of the openings the flow of the material being shaped by the sharp edges of another of the openings is concurrently increasing, thereby producing an aggregate flow of the material through said nozzle means which continues without undue surging.

4,003,689

DIE-GAP ADJUSTING MEANS

Eugene Harrison, Central, and Edgar G. Williams, Greenville, both of S.C., assignors to Celanese Corporation, New York, N.Y.

Filed Sept. 15, 1975, Ser. No. 613,678
Int. Cl.² B29F *3/04*
U.S. Cl. 425—466 **19 Claims**



1. An adjusting means for controlling the thickness of extrudate moving from a die comprising:

a non-flexible block, connected to a die body, provided with a tapped hole;

a flexible block, connected to a flexible lip of said die body, provided with a tapped hole; and

a bolt including a first threaded cylindrical section, having a first thread pitch, accommodated in said tapped hole provided on said non-flexible block, and a second threaded cylindrical section, having a second thread pitch, accommodated in said tapped hole provided on said flexible block, said second thread pitch being different from said first thread pitch.

4,003,690

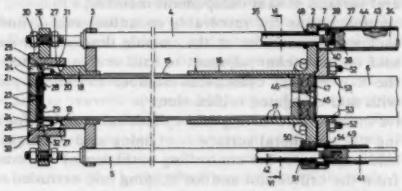
CLOSURE DEVICE

Gilbert Magnollay, Romanel, Switzerland, assignor to Maillefer S.A., Switzerland

Filed Mar. 22, 1976, Ser. No. 668,920
Int. Cl.² B29F *3/04*
U.S. Cl. 425—466 **11 Claims**

1. A downstream closure device for apparatus used in treating large-diameter insulated electrical conductors, said device

comprising a main exit gasket, a movable plug, an auxiliary exit gasket borne by said plug, and means for controlling the



movement of said plug, wherein said means comprise a control-sleeve cooperating with said plug for causing said plug to open gradually.

4,003,691

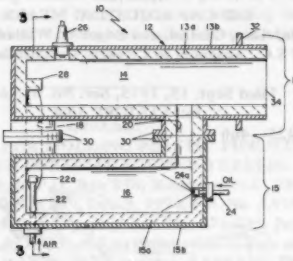
RECIRCULATING BURNER

Alex F. Wormser, Marblehead, Mass., assignor to Consolidated Natural Gas Service Co., Inc., Pittsburgh, Pa.

Filed Aug. 22, 1975, Ser. No. 606,841

Int. Cl.² F23L 7/00

U.S. Cl. 431—116 **2 Claims**



1. A burner for burning a vaporizable liquid fuel comprising:

a housing,

a combustion chamber in said housing, said combustion chamber having an inlet and an outlet,

a vaporizing chamber in said housing, said vaporizing chamber having an inlet and an outlet,

a first passage interconnecting said combustion chamber inlet with said vaporizing chamber outlet, said first passage serving as a mixing chamber,

a second passage interconnecting said combustion chamber toward said combustion chamber outlet with said vaporizing chamber inlet, for carrying hot combustion gases from said combustion chamber into said vaporizing chamber,

a vaporizable liquid fuel inlet atomizer connected to said vaporizing chamber and positioned to direct atomized liquid fuel into said vaporizing chamber, for vaporization therein of said fuel by said hot combustion gases, said atomizer being effective to support vaporization of said fuel before the same touches a wall,

an air inlet at the interface of said first passage and said vaporizing chamber outlet, positioned to direct air under pressure through said first passage and combustion chamber inlet into said combustion chamber,

said second passage, said vaporizing chamber, and said first passage together defining a recirculation path for hot combustion gases from said combustion chamber back to said combustion chamber inlet, said path having sufficient width to provide in conjunction with said air inlet enough recirculation to maintain blue-flame combustion,

said hot combustion gases being drawn by suction created by said air inlet into said vaporizing chamber and said vaporized fuel and hot gases being drawn by said suction into said first passage, where they are mixed with air entering from said air inlet to provide a combustible mixture, said mixture entering said combustion chamber through said combustion chamber inlet for burning in said combustion chamber, and

said combustion chamber being cylindrical, said first passage entering said combustion chamber tangentially thereto through said combustion chamber inlet, said second passage connecting tangentially with said combustion chamber, said vaporizing chamber being cylindrical, said second passage entering said vaporizing chamber tangentially through said vaporizing chamber inlet, and said fuel inlet atomizer being directed into said cylindrical vaporizing chamber along the axis thereof.

4,003,692

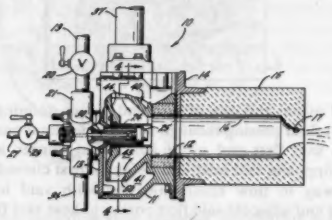
HIGH VELOCITY BURNER

Edward E. Moore, Rockford, Ill., assignor to Eclipse, Inc., Rockford, Ill.

Filed Aug. 6, 1975, Ser. No. 602,248

Int. Cl.² F23R 1/02

U.S. Cl. 431—158 **4 Claims**



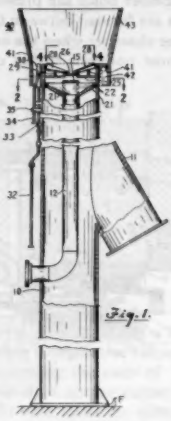
1. A dual fuel, high velocity burner comprising a tubular body having a rear upstream end and a forward downstream end, an annular partition within said body and dividing the latter into inner and outer chambers, said inner chamber being open at the downstream end of said body and said outer chamber being substantially closed at the downstream end of said body, both of said chambers being substantially closed at the upstream end of said body, a tube extending axially within the central portion of said inner chamber, first means within said tube for delivering a flow of gaseous fuel through said tube for ignition of such fuel into a flame adjacent the downstream end of said body, second means within said tube for alternatively delivering a flow of liquid fuel and atomizing air through said tube for atomization and ignition of such fuel into a flame adjacent the downstream end of said body, a source of forced combustion air communicating with said outer chamber between the ends thereof to produce a generally circumferential flow of air within said outer chamber, a series of passages formed through and spaced circumferentially around said partition and extending substantially tangentially of said tube to impart a rotational spinning motion to the combustion air flowing from said outer chamber to said inner chamber through said passages, said inner chamber converging inwardly upon progressing toward the downstream end of said body so as to form the spinning combustion air into a vortical swirl which flows out of the open end of said inner chamber and imparts a swirling motion to said fuel and said flame, a tubular burner block secured to the downstream end of said body and having a generally cylindrical internal wall communicating with and extending a substantial distance beyond the open end of said inner chamber so as to receive the swirling stream from said inner chamber, and an inwardly converging internal wall at the downstream end of said cylindrical wall and defining a central discharge nozzle for radially contracting the swirling stream and increasing the forward velocity thereof.

4,003,693

FLARE STACK GAS BURNER

John F. Straitz, III, Jenkintown, Pa., assignor to Combustion Unlimited Incorporated, Elkins Park, Pa.

Filed Mar. 6, 1975, Ser. No. 555,974
Int. Cl.² F23D 13/20
U.S. Cl. 431—202 4 Claims



1. A flare stack gas burner for combustible waste gas comprising

a vertical stack pipe having a free upper end for combustion therebeyond,

means for delivering primary air under pressure to the interior of the stack pipe for delivery to said upper end,

a waste gas delivery pipe connected to a supply of waste combustible gas under pressure interiorly vertically centrally disposed in said stack pipe,

said waste gas delivery pipe in spaced relation below said upper end of said stack pipe having a plurality of outwardly extending arms with spaces between said arms for upward movement of air,

said arms having elongated discharge slot portions facing toward said upper end of said stack pipe for waste gas discharge therethrough and extending substantially the distance between said waste gas pipe and said stack pipe, and

a fixedly mounted diffuser disposed at the upper end of said stack pipe,

said diffuser being adjacent to and in vertically spaced relation to said arms to provide a pre-combustion waste gas and air mixing space therebetween,

said diffuser comprising a central hub with a plurality of radially disposed titled vanes extending therefrom imparting a vortex pattern to the air and waste gas passing through said diffuser for turbulent burning therebeyond in a vortex pattern.

4,003,694

FUEL DELIVERY SYSTEM FOR A HAND-HELD LIQUID FUEL CIGARETTE LIGHTER

Charles Lowell, Concord, Mass., assignor to Wingaersheek, Inc., Peabody, Mass.

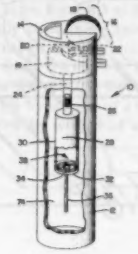
Filed Dec. 22, 1975, Ser. No. 643,403
Int. Cl.² F23Q 1/02
U.S. Cl. 431—344 12 Claims

1. A cigarette lighter fuel delivery system for feeding gaseous fuel to the burner of the lighter from a reservoir of volatile liquid fuel in the lighter, said system comprising:

a fuel vaporizing chamber in the liquid fuel reservoir, one end of said chamber being in communication with the burner of said lighter through a manually operable valve,

a wall of said chamber spaced apart from said one end defining a passage for passing fuel from the reservoir to said chamber; and

a valve in said passage, said valve being biased to open said passage to allow fuel therethrough when the pressure in said chamber falls a selected amount below the pressure in said reservoir, said valve comprising:



an anchoring portion in contact with a wall of said chamber;

a poppet for blocking said passage; and

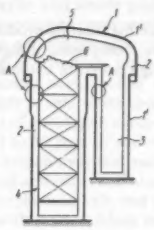
at least one resilient arm extending from said anchoring portion to said poppet for maintaining a selected biasing force on said poppet.

4,003,695

STOVE OF BLAST FURNACE

Gennady Petrovich Kandakov, Sevastopolsky prospekt, 51, korpus 2, kv. 163, Moscow, and Albert Nikolaevich Zharikov, ulitsa Koslora, 64, kv. 37, Dnepropetrovsk, both of U.S.S.R.

Filed June 3, 1975, Ser. No. 583,245
Int. Cl.² F24H 1/00; F27B 1/14
U.S. Cl. 432—219 4 Claims



1. A stove of a blast furnace comprising a metal jcket; a gunite on the inner surface of said jacket; a gastight cover in the form of a layer sprayed on the surface of said gunite coating, said layer being selected from the group consisting of metals and heatproof synthetic materials; heat-insulating layers adjacent to said gastight cover from the inner side of the stove; and refractory layers positioned over said heat-insulating layers from the inner side of the stove.

4,003,696

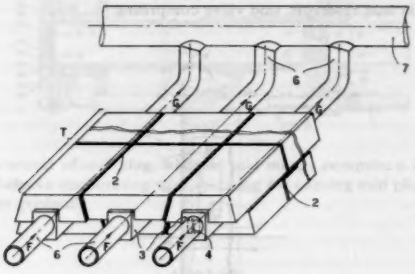
FLAT SELF-SUPPORTING VAULT FOR TUNNEL TYPE FURNACES PARTICULARLY FOR BAKING BRICKS AND TILES

Aldo Rolla, Via S. Andrea 7, Monza, Italy

Filed July 7, 1975, Ser. No. 593,218
Claims priority, application Italy, July 12, 1974, 25114/74
Int. Cl.² F27D 1/12
U.S. Cl. 432—238 6 Claims

1. A flat vault for tunnel-type furnaces for baking materials having parallel extended side walls, comprising a plurality of

linear self-supporting beams laid transversely to the direction of forward movement of the material to be baked and bearing at their respective ends on the side walls of said tunnel, each beam being fixed to the adjacent beams and comprising a plurality of segments of a refractory material, clamped to each



other by means of expansion joints, and each segment being provided with an inner metal core and an insulating material sheath surrounding said core, whereby said core and inner surfaces of said sheath define, along the whole length of each of said segments, a free volume suitable to provide a passage for a cooling fluid, flowing by means of a cooling system.

4,003,697

PRESSURE FURNACE FOR TREATING PRODUCTS AT HIGH TEMPERATURE AND HIGH PRESSURE

Staffan Elmgren, Helsingborg, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

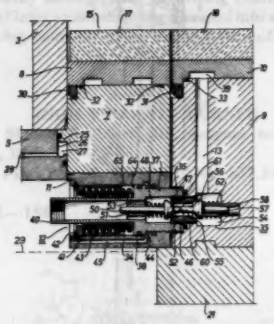
Filed July 3, 1975, Ser. No. 593,048

Claims priority, application Sweden, July 30, 1974, 7409804

Int. Cl.² F27B *5/04*; F27D *1/12*

U.S. Cl. 432—238 **5 Claims**

1. A pressure furnace for treating products at high temperature and high pressure, comprising a high pressure chamber including a vertical high pressure cylinder with end closures projecting into the cylinder, a press stand with a window aperture which is somewhat larger than the length of the high pressure chamber when the end closures are fully inserted, which press stand encloses the high pressure chamber during the pressing operation and takes up the axial forces which a pressure medium in the pressure chamber exerts on the end closures, and a support member for the pressure chamber, which support member holds the pressure chamber in such a position that gaps are formed between the press stand and the end closures of the chamber when the end closures are moved into their innermost positions in the cylinder, in which the



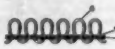
lower end closure comprises a bottom portion provided with cooling channels, which bottom portion carries material to be pressed during charging and pressing, at least one stationary and one movable connection unit for connecting the bottom portion to a coolant source, of which the movable unit is radially displaceable between a connected position in contact with the stationary connection unit and a released position, and a valve member in at least one of the connection units, which, in released position, is held pressed against a valve seat and means carried by one of the units to raise the valve from its seat in response to relative movement between the units to the connecting position.

4,003,698
PRODUCT AND METHOD OF PRINTING CARPET

Robert W. Snyder, Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

Filed Sept. 12, 1975, Ser. No. 612,907
Int. Cl.² D06P *1/00*
U.S. Cl. 8—1 XB 6 Claims

PRIMARY BACKING
DESIGN PRINTED ON PRIMARY BACKING BY SUBLIMABLE DYES
TUFTING YARNS INTO PRIMARY BACKING
HEATED AIR DYEING OF CARPET



1. A process for making a decorative carpet through the use of sublimable dyes comprising the steps of:

a. printing sublimable dyes on the carpet backing prior to the time the carpet face yarns are tufted into the carpet backing,

b. tufting the carpet face yarn into the carpet backing with the carpet face yarn pile being on the side of the carpet backing which contains the sublimable dyes, and then

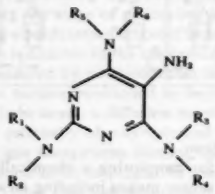
c. transferring the sublimable dyes from the carpet backing to the carpet face yarn through the application of a heated gaseous medium passing through the carpet product from the carpet backing side of the carpet to the carpet face yarn side of the carpet.

4,003,699
OXIDATION HAIR DYES BASED UPON TETRAAMINOPYRIMIDINE DEVELOPERS

David Rose, Dusseldorf-Holthausen; Ferdi Saygin, Erkrath, and Erwin Weinrich, Dusseldorf-Holthausen, all of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf, Germany

Filed Nov. 22, 1974, Ser. No. 526,232
Int. Cl.² A61K *7/13*
U.S. Cl. 8—10.2 9 Claims

1. An aqueous preparation for the dyeing of hair consisting essentially of (1) from 0.2% to 5% by weight of an oxidation dyestuff combination of a developer component, and a coupling component in substantially equimolar amounts, said developer component consisting essentially of (A) a tetraaminopyrimidine of the formula



wherein R_1, R_2, R_3, R_4, R_5 and R_6 are each selected from the group consisting of hydrogen, phenyl, alkyl having 1 to 4 carbon atoms, phenylalkyl having 7 to 10 carbon atoms, phenylalkenyl having 7 to 10 carbon atoms,

$X-(CH_2)_n-$

wherein n is an integer from 1 to 4, and X is selected from the group consisting of hydroxyl, halogen and NR_7R_8- in which R_7 and R_8 are selected from the group consisting of hydrogen and alkyl having 1 to 4 carbon atoms, and together with the nitrogen atom R_7 to R_8 form a 5 to 6 membered heterocyclic ring optionally containing an additional nitrogen atom or an oxygen atom,

and wherein R_1 and R_2 or R_3 and R_4 or R_5 and R_6, together with the nitrogen atom form a 5 to 6 membered heterocyclic ring, optionally containing another nitrogen or oxygen atom in the ring or (B) a water-soluble acid addition salt of (A); (2) from 0% to 5% by weight of a direct dyestuff; (3) from 0% to 30% by weight of a surfactant; (4) from 0% to 25% by weight of a thickener; and (5) the balance up to 100% by weight of water.

4,003,700
CLEANING FABRICS

Frederick William Gray, Summit, and Jon C. Jervert, Piscataway, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 447,712, March 4, 1974, which is a continuation of Ser. No. 138,372, April 28, 1971, abandoned. This application Apr. 16, 1976, Ser. No. 677,653
Claims priority, application United Kingdom, May 1, 1970, 21080/70
Int. Cl.² D06L *3/02*
U.S. Cl. 8—111 26 Claims

1. Process for the removal of stains from fabrics which comprises forming an aqueous wash medium by dispersing in water a mixture consisting essentially of a peroxygen compound, an activator for said peroxygen compound which activator has carboxylic acyl amide groups and which activator reacts with said peroxygen compound to form a percarboxylic acid, a salt of an aminopolycarboxylic acid selected from the group consisting of trisodium nitrilotriacetate and ethylene diamine tetraacetic acid sodium salt, the proportions being such as to supply to said water about 5 to 50 ppm of said activator, an amount of peroxygen compound within the range representing about 3 to 80 ppm of active oxygen and substantial excess of active oxygen over that stoichiometrically equivalent to the amount of activator, and about 100 to 300 ppm of said aminopolycarboxylic acid salt, and maintaining said wash medium in contact with stained fabric immersed therein for a period of time sufficient to effect bleaching of said fabric.

4,003,701
GRAFT COPOLYMERIZATION PROCESSES

W. James Brickman, Philadelphia, Pa., assignor to Scott Paper Company, Philadelphia, Pa.

Filed Feb. 2, 1971, Ser. No. 112,071
Int. Cl.² D06M *13/02, 15/26, 13/08*
U.S. Cl. 8—115.6 2 Claims

1. A process for simultaneously printing and grafting a water-insoluble, thioated fabric which comprises:

A. applying to said fabric a printing paste comprising:

1. at least one ethylenically unsaturated monomer,

2. a peroxidic free-radical initiator, and

3. a pigment or a dyestuff; and

B. subjecting the pasted fabric to microwave energy having a frequency of about 900 Mega Hertz or greater.

4,003,702

METHOD FOR CARBONIZING CELLULOSE MATERIALS

Jean Knott, Polleur, Belgium, assignor to I.W.S. Nominee Company Limited, London, England

Filed Apr. 15, 1974, Ser. No. 461,133

Claims priority, application Germany, Apr. 25, 1973, 2320825

Int. Cl.² D01C *3/00, 5/00*

U.S. Cl. 8—140 **11 Claims**

1. A method of carbonizing cellulose material present in a substrate which also comprises noncarbonizable fibers and solvent soluble material, said method comprising the steps of:

treating said substrate with a solution of anhydrous HCl gas in an organic solvent for said solvent soluble material inert as to said non-carbonizable fibers at a temperature, for a time and at an acid concentration sufficient to achieve carbonization of the cellulose material without damage to the non-cabonizable fibers;

expressing some of said solution from said substrate; and

subsequently drying the treated substrate.

4,003,703

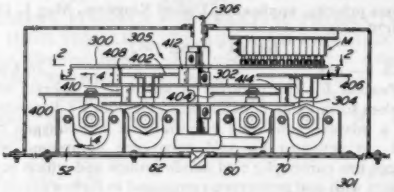
METHOD OF STERILIZING USING A ROTARY DISK-BALL VALVE CONTROL SYSTEM

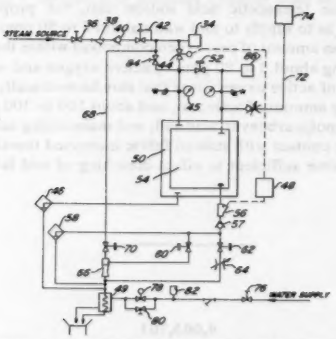
Robert A. G. Montgomery, Jr., Southampton, and Richard Laurence Burley, Holland, both of Pa., assignors to Environmental Tectonics Corporation, Southampton, Pa.

Filed Oct. 18, 1974, Ser. No. 515,939

Int. Cl.² A61L *1/00, 5/00*

U.S. Cl. 21—56 **6 Claims**





1. A method for sterilizing an article in a chamber operatively connected to a plurality of ball valves provided with rotary means for opening and closing said ball valves, comprising:

programming a disc having a plurality of posts depending therefrom by providing said disc with a plurality of slots;

rotating said programmed disc in slidable contact with a plurality of switches to cause said switches to open and close in a predetermined sequence determined by said slots and to cause said posts to contact said ball valve rotary means to open and close said ball valves in a predetermined sequence determined by said posts;

admitting a gaseous sterilizing agent to said chamber;

maintaining the temperature of said sterilizing agent in said chamber within a preselected range of a set point temperature for a predetermined interval of time;

exhausting said sterilizing agent from the chamber and

controlling the sequence and duration of said admitting, maintaining and exhausting steps in response to said predetermined sequence in which said switches are opened and closed and said posts contact said rotary means in response to said rotation of said programmed disc.

4,003,704

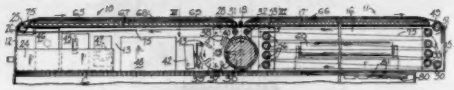
MEDICAL EXAMINATION TABLE COVER SYSTEM HAVING STERILIZING MEANS THEREFOR

Gabriel J. Zurolo, and Elmer G. Bull, both of Hamden, Conn., assignors to Mark Medical Supply, Inc., New Haven, Conn.

Filed Mar. 26, 1975, Ser. No. 562,220

Int. Cl.² A61G *13/00;* **A61L** *3/00*

U.S. Cl. 21—91 **8 Claims**



1. A medical examination table cover system comprising an examination table having a patient-supporting upper surface and an enclosed chamber below said upper surface, an endless web of cover material, first means for guiding said web to cause a unit length thereof to lie in a position exposed on said upper surface, additional means for guiding other lengths of said web through said enclosed chamber, means for subjecting said other lengths to a sterilization procedure in said chamber, and feed means for moving the exposed unit length of the web from said upper surface into said chamber and another length of said web into said exposed position.

4,003,705

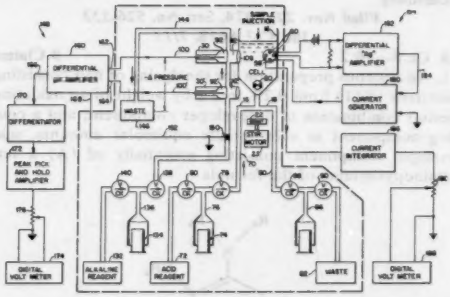
ANALYSIS APPARATUS AND METHOD OF MEASURING RATE OF CHANGE OF ELECTROLYTE pH

Edmund E. Buzza, and James C. Sternberg, both of Fullerton, Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed June 12, 1975, Ser. No. 586,435

Int. Cl.² G01N *27/26, 31/16, 33/16*

U.S. Cl. 23—230 R **21 Claims**



1. In combination:

sensor means for monitoring a chemically reactable substance, said sensor means including an electrolyte which undergoes a chance in pH with time upon reaction with said substance,

means coupled to said sensor means for generating an output signal proportional to the instantaneous time rate of change of pH of said electrolyte; and

means for measuring said output signal to determine the concentration of said substance in said electrolyte.

4,003,706

METHOD AND REAGENTS FOR THE DETECTION, ESTIMATION AND QUANTITATIVE DETERMINATION OF NITRATE IONS

Eugen Szekely, Beer-Sheva, Israel, assignor to Ben-Gurion University of the Negev Research & Development Authority, Beer-Sheva, Israel

Filed Jan. 21, 1976, Ser. No. 650,851
Claims priority, application Israel, Feb. 21, 1975, 46677
Int. Cl.² G01N 31/22
U.S. Cl. 23—230 R 24 Claims

1. A method for the detection, estimation and quantitative determination of nitrate ions comprising preparing a nitrate reagent comprising:

a. about 0.005 to 0.05 wt/v %. of a diphenylamine redox indicator;
b. about 0.1 to 2.0 wt/v %. 4,4'-sulfonyldianiline;
c. about 0.1 to 2.0 wt/v %. of a chloride selected from the group consisting of ammonium chloride, hydroxylamine hydrochloride or a mixture thereof;
d. concentrated sulfuric acid; and
e. concentrated phosphoric acid or an alkaline dihydrogen phosphate;

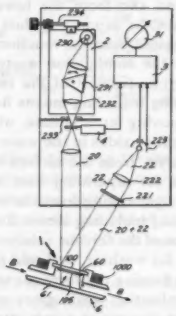
and combining said reagent with an aqueous nitrate sample.

4,003,707

METHOD AND ARRANGEMENT FOR MEASURING THE CONCENTRATION OF GASES

Dietrich W. Lübbers, and Norbert Opitz, both of Dortmund, Germany, assignors to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V., Munich, Germany

Filed Feb. 26, 1976, Ser. No. 661,636
Claims priority, application Germany, Feb. 28, 1975, 2508637
Int. Cl.² G01J 3/30; G01N 21/26, 21/48, 33/16
U.S. Cl. 23—232 R 27 Claims



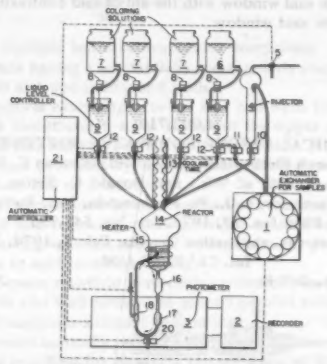
1. A method of measuring the concentration of gases in a sample comprising the steps of generating a monochromatic light beam having a predetermined color characteristic; generating light signals indicative of the concentration of gases in a sample to be measured by positioning an indicator having a light-transmissive surface positioned to be impinged by said monochromatic light beam, a diffusion membrane adapted to be placed in the proximity of a sample and being selectively permeable to a gas component thereof, and an indicating substance positioned to be impinged by the monochromatic light beam penetrating said light-transmissive surface and by said gas component penetrating said diffusion membrane, said indicating substance reacting when illuminated by said incident monochromatic light beam by emitting a resultant light beam having an emitted component which has a color characteristic different from said predetermined color characteristic; conducting said resultant light beam away from said indicating substance through said light-transmissive surface; and discriminating said emitted component from said resultant light beam so that the change in the color characteristic of said indicating substance can be measured and correlated with the concentration of gases in the sample.

4,003,708

AUTOMATIC PHOTOMETRIC ANALYZER

Isamu Taguchi, Tokyo; Akihiro Ono, Yokohama, and Ryutaro Matsumoto, Tokyo, all of Japan, assignors to Nippon Steel Corporation and Kokusai Electric Co., Ltd., both of Tokyo, Japan

Continuation of Ser. No. 511,205, Oct. 2, 1974, abandoned, which is a continuation of Ser. No. 283,851, Aug. 25, 1972.
This application May 6, 1975, Ser. No. 575,078
Claims priority, application Japan, Aug. 26, 1971, 46-65729
Int. Cl.² G01N 31/00
U.S. Cl. 23—253 R 11 Claims



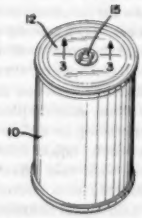
1. An automatic photometric analyzer, comprising an automatic exchanger having a vessel and carrying solutions to be analyzed, a reactor, injector means for injecting a sample solution from said vessel to said reactor, water supply means, coloring solution supply means, means for controlling the supply of said water and coloring solution to said reactor to form a reactant with said sample solution, photometric analysis means, for measuring the absorbency of the reactant, and fluid passage means coupled to said reactor for circulating said reactant from the reactor through the photometric means and back to the reactor.

4,003,709

VISUAL SPOILAGE INDICATOR FOR FOOD CONTAINERS

John C. Eaton, Dayton; Marshall B. Kilgore, Franklin, and Richard B. Livingston, Dayton, all of Ohio, assignors to Visual Spoilage Indicator Company, Dayton, Ohio

Filed Oct. 2, 1975, Ser. No. 619,017
Int. Cl.² G01N 31/02
U.S. Cl. 23—253 R 2 Claims



1. A visual spoilage indicator for food containers for providing a visual indication of the possibility of deterioration or

contamination of the food contents by reasons of CO_2 evolution, comprising

a. a liquid impermeable assembled plug of plastic material in an aperture in a lid of the food container,

b. a window forming a portion of said plug,

c. said plug also including a portion of microporous plastic which is CO_2 gas permeable and means forming a contrasting colored field opposite said window,

d. means forming a cup in said plug for receiving an indicator means, and

e. indicator means comprising an aqueous liquid calcium hydroxide solution at approximately 0.19 molarity sealed within said cup formed in said plug for producing a visible white calcium carbonate precipitate when the CO_2 level evolved upon deterioration of said food contents and passing through said gas permeable microporous plastic portion of said plug exceeds approximately a 5% CO_2 level, said visible white precipitate being observable through said window with the aid of said contrasting field opposite said window.

4,003,710

CHEMICAL FEEDER FOR WATER SOFTENERS

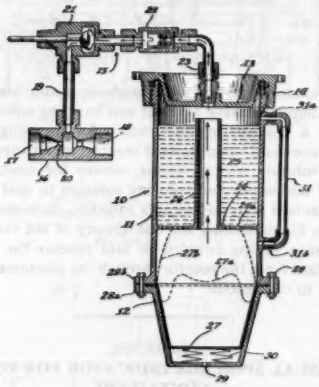
Andrew Joseph Fleckenstein, Brookfield; Herman C. Mitchell, Wauwatosa, both of Wis., and Donald G. Fettes, Regina, Canada, assignors to L. W. Fleckenstein, Inc., Butler, Wis.

Filed Jan. 17, 1975, Ser. No. 541,936

Claims priority, application Canada, Feb. 1, 1974, 191,533

Int. Cl.² B01F *1/00*

U.S. Cl. 23—267 R **3 Claims**



1. A regenerative chemical system including a substantially vertical closed container, a substantially horizontal perforated wall member dividing said container into an upper first chamber adapted to contain a solid regenerative chemical and a lower second chamber adapted to contain a liquid solution of said chemical and to allow liquid communication between said first and second chambers, said second chamber defining a bottom wall therein, said bottom wall including a vent in communication with the atmosphere; flexible diaphragm disposed in said second chamber between said bottom wall and said perforated wall member, said diaphragm and said perforated wall member cooperating to define a variable effective storage volume therebetween; liquid inlet-outlet in said container in communication with said effective storage volume and adapted to be connected to a source of inlet liquid and adapted for removal of said liquid solution whereby said flexible diaphragm is adapted to flex in response to addition or withdrawal of said liquid solution from said container to vary the variable effective storage volume of said container.

4,003,711

APPARATUS FOR ELIMINATION OF NITROGEN OXIDES FROM COMBUSTION WASTE GASES

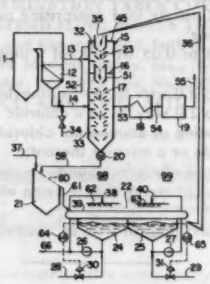
Yukio Hishinuma; Hidetoshi Akimoto, both of Hitachi; Zensuke Tamura, Kudamatsu, and Fumito Nakajima, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 11, 1974, Ser. No. 514,130

Claims priority, application Japan, Oct. 12, 1973, 48-113941

Int. Cl.² B01J *8/12, 23/94;* F01N *3/15*

U.S. Cl. 23—288 F **10 Claims**



1. An apparatus for the removal of nitrogen oxides (NOx) from combustion waste gases, comprising: a reaction tower having a combustion waste gas inlet and outlet; a fluent ferrous catalyst within said reaction tower; means for injecting a reducing gas into the combustion waste gases to deoxidize the nitrogen oxides in the presence of said ferrous catalyst within said reaction tower; means for moving said ferrous catalyst in a substantially closed path including entry into the top of said reaction tower, movement downwardly through said reaction tower in contact with the mixed combustion waste gases and the reducing gas, and exit from the lower portion of said reaction tower; means for separating dust from said ferrous catalyst after it has exited from the reaction tower where dust was picked-up from the combustion waste gases; means for regenerating the ferrous catalyst of the reaction tower; said means for regenerating including means for washing the ferrous catalyst for removing ferric sulfate, which was produced by reaction of the sulfur oxides in the waste combustion gases with the ferrous catalyst, from the surface of the ferrous catalyst after the means for separating dust has separated dust from the ferrous catalyst exiting from the reaction tower; said means for regenerating including means for providing ferrous sulfate on the surface of the ferrous catalyst after it has passed through said means for washing; and said regenerating means including means for heating the ferrous catalyst after washing by a part of the combustion waste gases prior to their movement in contact with the mixed combustion waste gases and the reducing gas in the reaction tower.

4,003,712

FLUIDIZED BED REACTOR

Adam R. Miller, Indianapolis, Ind., assignor to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 64,106, July 29, 1970, abandoned, which is a continuation of Ser. No. 662,045, Aug. 21, 1967, abandoned. This application Mar. 14, 1975, Ser. No. 558,435

Int. Cl.² B01J *8/24*

U.S. Cl. 23—288 S **7 Claims**

1. A fluid bed reactor system in which olefin monomers may be catalytically polymerized continuously in a fluid bed under gas medium fluidized conditions, and comprising

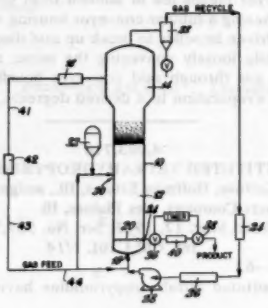
a vertical reactor having a cylindrical lower section and an upper section have a cross section greater than that of

said lower section, said lower section being adapted to house a polymerization zone in which the catalyzed polymerization reaction may be conducted under gas medium fluidized fluid bed conditions, and said upper section being adapted to function as a velocity reduction zone for the recovery of particles entrained in fluidizing medium entering said upper section from said lower section, fluidizing medium permeable distribution plate means within and towards the base of said lower section, said distribution plate means being adapted to diffuse fluidizing medium up through the fluidized bed in said lower section and to support said bed thereon when said bed is quiescent,

fluidizing medium supply line means in gas communication with, and adapted to supply fluidizing medium and make up gas to, the lower section of said reactor and below said distribution plate means,

catalyst injection means in catalyst supply communication with, and adapted to supply particulate olefin polymerization catalyst to, the side of the fluidized bed in the polymerization zone in said lower section,

polymer product recovery means in polymer product recovery communication with, and adapted to recover polymer product from, the base of said polymerization zone and above said distribution plate means,



said polymer product recovery means comprising a valved chamber which is adapted to recover polymer product from said reactor at a rate equal to the rate of polymer product formation with the aid of a pressure differential between the pressure within said reactor and the pressure within said chamber,

fluidizing medium recycle line means in gas communication with said reactor and adapted to recover fluidizing medium from the upper section of said reactor and to recycle the thus recovered fluidizing medium to the lower section of said reactor at a point below said distribution plate means,

heat exchange means within said recycle line means adapted to remove heat of reaction from the recycled fluidizing medium,

gas analyzer means in gas communication with said velocity reduction zone and adapted to analyze gas component deficiency in the fluidizing medium in sad velocity reduction zone, and

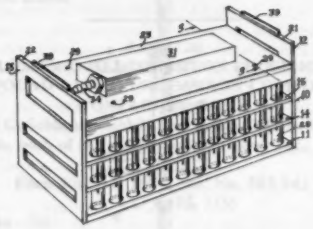
said fluidizing medium supply line means being in gas communication with said recycle line means and in gas supply activating response communication with said gas analyzer means and adapted to supply deficient components of the fluidizable medium to said recycle line means in response to gas supply activating communication from said gas analyzer means.

4,003,713

MULTIPLE TEST TUBE EVAPORATOR

Everett N. Bowser, 715 N. Main St., Glen Ellyn, Ill. 60137

Filed Aug. 14, 1975, Ser. No. 604,557
Int. Cl.² B10L *3/00*
U.S. Cl. 23—292 **5 Claims**



1. A multiple test tube evaporator comprising

a. a rack having a substantially rectangularly shaped bottom wall and upstanding end walls,

b. supports extending between said end walls below a midline therethrough so as to permit the upper portions of said end walls to be yieldably separable,

c. means provided by said bottom wall for receiving the closed end of a test tube,

d. means provided by said supports, in vertical alignment with said receiving means provided by said bottom wall, retaining said test tubes in a perpendicular position relative to said receiving means,

e. a vacuum manifold removably carried between said separable end wall portions in spaced parallel relation above said supports and said bottom wall,

f. recessed conically shaped seats formed in the underside of said manifold for receiving the open end of the test tube retained by said supports so as to close the same, and

g. an evaporating needle depending from the underside of and having communication with said manifold concentrically of said recessed conically shaped seats for projection into a test tube held by said rack.

4,003,714

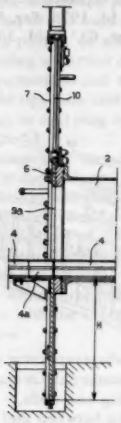
DEVICE FOR CLOSING INLET AND OUTLET PORTS OF A TUNNEL AUTOCLAVE

Giorgio Foglino; Alfio Battain, both of Turin, and Raffaello Cappucciati, Venaria (Turin), all of Italy, assignors to Superga S.p.A., Turin, Italy

Filed Oct. 24, 1975, Ser. No. 625,624
Claims priority, application Italy, Nov. 15, 1974, 70349/74
Int. Cl.² B01J *3/02;* **E01B** *11/42*
U.S. Cl. 23—290 **2 Claims**

1. In a tunnel autoclave having inlet and outlet ports at opposite ends, at least one guide rail extending through said autoclave and carriages movable along said rail in groups at predetermined intervals for the transportation of articles through said autoclave, respective guillotine doors assembled on said inlet and outlet ports, each of said guillotine doors comprising a first part having a size at least complementary to the size of the respective port and a second part having an opening for the passage of said carriages, said rail having a fixed portion within said autoclave and a movable portion fixed to said second part of said door adjacent an edge portion of the opening therein, each door being movable between an open position in which the opening of said second part of said door is aligned with a corresponding port of the autoclave and

the movable portion of said rail is aligned with the fixed portion of said rail and a closed position in which the first part of



said door is aligned with the corresponding port of said autoclave.

4,003,715

COPPER-MANGANESE-ZINC BRAZING ALLOY

Paul J. Cascone, New Rochelle, N.Y., assignor to A. Johnson & Co. Inc., Nynashamn, Sweden

Continuation-in-part of Ser. No. 427,326, Dec. 21, 1973, abandoned. This application June 13, 1975, Ser. No. 586,562

Int. Cl.² B32B *15/18, 15/20*

U.S. Cl. 29—182.3 **14 Claims**

1. A brazed joint comprised of assembled parts with a fused brazing alloy interposed therebetween, at least one part being a ferrous metal, said fused brazing alloy making up the joint consisting essentially by weight of about 15% to 30% manganese, about 15% to 30% zinc, 0 to about 10% nickel and the balance essentially copper ranging from about 45% to 65% and having a melting point ranging from about 1500° F to 1700° F.

4,003,716

CAST CEMENTED REFRACTORY METAL CARBIDES HAVING IMPROVED SINTERED DENSITY

James Q. Steigelman, Athens; Joseph J. Cleveland, Wysox; Richard N. Kleiner, Towanda, all of Pa., and Frank Rymas, Sterling Heights, Mich., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed July 15, 1974, Ser. No. 488,727

Int. Cl.² B22F *7/00;* **C22C** *1/04;* **C04B** *31/02*

U.S. Cl. 29—182.7 **13 Claims**

1. A cemented refractory metal carbide article consisting essentially of from about 75 to 97 weight % of discrete particles of at least one refractory metal carbide distributed in a matrix of from about 3 to about 25 weight % of a lower melting binder metal, said article having a predetermined configuration including at least a portion having a thickness of from about 0.004 inches to about 0.08 inches defined by at least 2 uneroded formed surfaces, characterized in that said article exhibits A-type, B-type and C-type porosities in accordance with ASTM specification No. B-276-54 of up to and including A_3, B_3 and C_3.

4,003,717

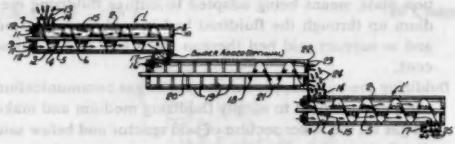
METHOD AND APPARATUS FOR RECOVERING BY-PRODUCT SILT FINES FROM A SLURRY THEREOF

Boyd E. Cass, Ligonier; David W. Coate, and Joseph R. Quigley, both of Pittsburgh, all of Pa., assignors to Carad, Inc., Pittsburgh, Pa.

Filed June 27, 1975, Ser. No. 591,161

Int. Cl.² C10L *5/00, 5/22*

U.S. Cl. 44—10 R **31 Claims**



12. The method of recovering coal fines from a slurry thereof having a moisture content in the area of 30% or more, comprising the steps of dissociating the slurry mass into discreet units, loosely conveying the dissociated coal slurry through a tubular conveyor housing with a continuous rotary-driven impeller while simultaneously flowing hot air in contact with said discreet units through said conveyor housing to uniformly break up and dry said discreet units by evaporation into particles having a moisture content of about 15% to 25%.

23. Apparatus for recovery of fines from a slurry thereof comprising means to dissociate the slurry mass into discreet units, conveyor means fed in tandem from said dissociation means and having a tubular conveyor housing with a continuous rotary-driven impeller to break up said discreet units into particles while loosely conveying the same, and means for forcing hot gas through said conveyor housing to dry said particles by evaporation to a desired degree.

4,003,718

SUBSTITUTED TETRAHYDROPYRIMIDINES

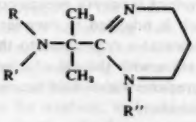
Marion J. Gattuso, Hoffman Estates, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Mar. 12, 1975, Ser. No. 557,744

Int. Cl.² C10L *1/14*

U.S. Cl. 44—63 **13 Claims**

1. A substituted tetrahydropyrimidine having the generic formula:



in which R and R′ are independently selected from the group consisting of alkyl of from 1 to 20 carbon atoms, cycloalkyl of from 3 to 8 carbon atoms in the ring, phenyl and benzyl, and R″ is hydrogen or alkyl of from 1 to 20 carbon atoms.

4,003,719

SCHIFF BASES AS BIOCIDES IN PETROLEUM PRODUCTS

David R. McCoy; Raymond Cadorette, and George W. Eckert, all of Wappingers Falls, N.Y., assignors to Texaco Inc., New York, N.Y.

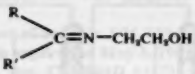
Filed Feb. 5, 1975, Ser. No. 547,279

Int. Cl.² C10L *1/22*

U.S. Cl. 44—63 **2 Claims**

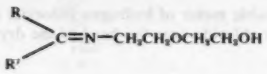
1. A fuel composition comprising a mixture of hydrocarbons boiling in the range of about 70° to 625° F. containing from about 0.05 to 0.1 volume percent of at least one hydrocarbon soluble Schiff base selected from the group consisting of:

N-Benzylidenemethylamine;
an alkyliminoethanol of the formula:

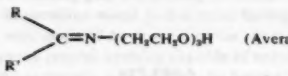


wherein

taken together, form an alkyl group having from 11 to 13 carbon atoms;
an alkyliminoethoxyethanol of the formula:

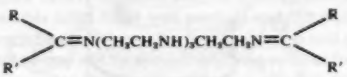


wherein R and R′, taken together, form an alkyl group having from 11 to 13 carbon atoms; an imino ethoxylate of the formula:



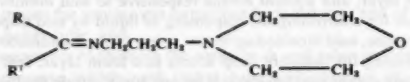
wherein

taken together form an alkyl group having 11 to 13 carbon atoms; a tetraethylenepentamine base of a ketone of the formula:



wherein

taken together form an alkyl group having from 11 to 13 carbon atoms; and, an alkyliminopropyl morpholine of the formula:



wherein

taken together form an alkyl group having from 11 to 13 carbon atoms.

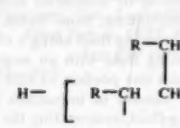
4,003,720

TELOMERIC-HYDROCARBON PHOSPHORUS COMPOUND AND HYDROCARBON COMPOSITION CONTAINING SAME

Raymond C. Schlicht, Fishkill, and Justin C. Powell, Wappingers Falls, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed June 11, 1975, Ser. No. 585,943
Int. Cl.² C10L *1/26*
U.S. Cl. 44—76 **4 Claims**

1. A motor fuel composition comprising a mixture of hydrocarbons in the gasoline boiling range and a surface active amount ranging from about 0.00002 to 0.04 weight percent based on said fuel composition of a telomeric phosphorus compound represented by the formula:



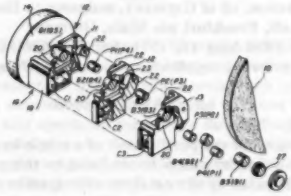
in which R is a hydrocarbyl radical having from 1 to 18 carbon atoms and *n* has a value from 1 to 25 with the average value for *n* being from 1 to 10.

4,003,721

CYLINDRICAL GRINDER

Ralph E. Price, and James C. Harris, both of Waynesboro, Pa., assignors to Landis Tool Company, Waynesboro, Pa.

Filed Apr. 26, 1976, Ser. No. 680,040
Int. Cl.² B24B *5/42*
U.S. Cl. 51—105 SP **7 Claims**



7. A cylindrical grinder comprising
means including a drive plate and a clamping assembly secured to the drive plate for rotating a workpiece about a selected axis,
the workpiece having a plurality of work diameters, one of which is to be ground and a plurality of main bearings located between one end of the workpiece and the one work diameter to be ground, at least one of the plurality of main bearings being located between the two work diameters,
a grinding wheel assembly including a grinding wheel for effecting stock removal from the one work diameter, and
a clamping assembly including means

for clamping each of said plurality of main bearings.

4,003,722

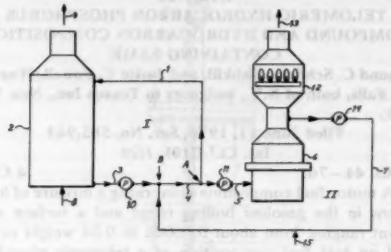
PROCESS AND ARRANGEMENT FOR THE REMOVAL OF IMPURITIES FROM GASES

Heinz Hölter, Beisenstr. 39, 439 Gladbeck, Germany

Filed Oct. 11, 1974, Ser. No. 514,283

Int. Cl.² B01D *47/06*

U.S. Cl. 55—68 **14 Claims**



1. A process for the removal of undesired components, particularly odor-causing components, from fluids, comprising the steps of conveying a cleansing fluid along a closed flow system; contacting the cleansing fluid with an impurity-containing fluid medium in at least one portion of said system so as to permit at least partial transfer of impurities from said fluid medium to said cleansing fluid; evaporating the impurity-laden cleansing fluid in another portion of said system so as to effect at least partial separation of the impurity-laden cleansing fluid into an impurity constituent and a purified cleansing fluid constituent; collecting said purified cleansing fluid constituent; combusting said impurity constituent subsequent to said separation; and recycling said collected and purified cleansing fluid constituent by withdrawing at least part of the latter from said other portion of said system and thereupon conveying said withdrawn cleansing fluid constituent towards said one portion of said system so as to conserve the amount of cleansing fluid employed in said closed system.

4,003,723

PURIFICATION OF CRUDE HYDROGEN CHLORIDE

Stefan Schäfer, Bruhl; Alexander Ohorodnik, Erftstadt-Liblar; Klaus Gehrmann, Erftstadt-Lechenich, and Albert Mainski, Rodenkirchen, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

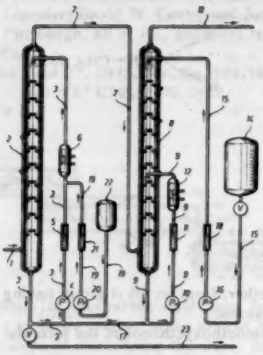
Filed May 17, 1976, Ser. No. 686,928

Claims priority, application Germany, May 20, 1975, 2522286

Int. Cl.² B01D *19/00*

U.S. Cl. 55—71 **11 Claims**

1. A process for the purification of a crude hydrogen chloride gas by-product, which is obtained in the production of chloroacetic acids by the catalytic chlorination of acetic acid with chlorine gas in contact with acetic anhydride and/or acetyl chloride, and continues to be contaminated, even after having been prepurified, with about 0.6 up to 3 % by volume of acetyl chloride and optionally with some minor proportion of chloroacetyl chloride, which comprises: introducing the crude hydrogen chloride gas into the base portion of a scrubbing zone and scrubbing it countercurrently therein with about 0.5 up to 20 liter, per normal cubic meter (S.T.P.) of hydrogen chloride gas, of a cooled scrubbing liquid under circulation and consisting substantially of about 20 up to 80 weight % of concentrated H_2SO_4, about 15 up to 60 weight % of acetic acid, and about 5 up to 50 weight % of water; introducing the resulting purified moist hydrogen chloride gas issuing at the head of the scrubbing zone into the base portion of a drying zone and drying it therein by scrubbing it countercurrently with precooled sulfuric acid under circulation, the sulfuric acid being used at a rate of about 0.5 up to 20 liter,



per normal cubic meter of hydrogen chloride; and removing dry hydrogen chloride near the head of the drying zone.

4,003,724

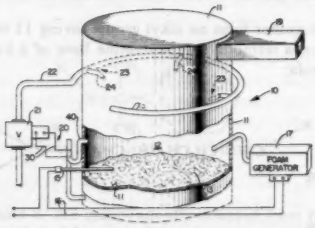
FOAM SCRUBBER AND METHOD

Thomas F. Payne, and Philip D. Sauer, both of Flathead, Mont., assignors to The Anaconda Company, New York, N.Y.

Filed Sept. 19, 1974, Ser. No. 507,375

Int. Cl.² B01D *47/04*

U.S. Cl. 55—87 **13 Claims**



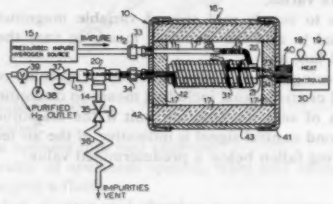
1. In a foam scrubber apparatus for separating gaseous pollutants and/or particulate matter from a gas with a foam which comprises means defining a treatment chamber having spaced gas inlet and gas outlet means which permits the flow of gas therethrough and a foam layer therebetween for separating gaseous pollutants and/or particulate matter as said gas travels through said layer, the improvement comprising monitoring means for monitoring the thickness and/or pressure drop of said foam layer, dispensing means for dispensing a liquid to said foam layer for at least partially collapsing said foam layer, and control means responsive to said monitoring means for controlling the dispensing of liquid by said dispensing means, said monitoring means comprises a manometer for measuring the pressure drop across said foam layer, said dispensing means comprising at least one spray nozzle positioned in said treatment chamber, and said control means is an electrically activated solenoid valve.

4,003,725

APPARATUS FOR PURIFYING HYDROGEN GAS

Julian Wilbur Bunn, Jr., Raleigh, N.C., and Charles Omar Buckley, Lewisburg, W. Va., assignors to Trienco, Inc., Raleigh, N.C.

Continuation-in-part of Ser. No. 576,730, May 12, 1975, Pat. No. 3,972,695. This application May 3, 1976, Ser. No. 682,408
Int. Cl.² B01D 53/22
U.S. Cl. 55—158 6 Claims



1. An apparatus for separating pure hydrogen gas from a hydrogen containing gas, comprising in combination:

a. a gas-impervious metal jacket tube having an inlet end and a vent end and having a circular cross-section and a continuous central opening capable of receiving a plurality of tubes therein, said jacket tube having the characteristics of withstanding high internal pressures and of being bendable to form a compact tortuous path and when in such tortuous condition said jacket tube substantially maintaining said continuous central opening;

b. a plurality of hydrogen permeable tubes inserted within said jacket tube and residing within said jacket tube along a substantial portion of the length of said permeable tubes, said permeable tubes each having at least one end thereof connected to pure hydrogen outlet means, and said permeable tubes each having a circular cross-section and a continuous central opening for the passing of pure hydrogen gas therethrough, said permeable tubes being grouped closely together and the spacing between said permeable tubes outer wall portions and the wall of said jacket tube central opening being such that said permeable tubes may not be appreciably bent without forming a corresponding bend in the respective adjacent portion of said jacket tube, said permeable tubes having the characteristic of being bendable to form a compact tortuous path without substantially altering said permeable tube continuous central opening, said jacket tube with said permeable tubes inserted therein together being bent into a compact tortuous path such that the outer wall portions of said permeable tubes remain in close spaced relation with the respective adjacent wall surfaces of said jacket tube central opening;

c. heater means located proximate the tubes for maintaining said tubes at a controlled temperature;

d. means for introducing a hydrogen containing gas into the inlet end of said jacket tube;

e. means for venting gas impurities from the vent end of said jacket tube; and

f. means for controlling the pressure in said tubes so that the pressure within said jacket tube and external of said permeable tubes is greater than the pressure within said permeable tubes.

4,003,726

CLEANING OF PARTICULATE OR MIST ELIMINATING APPARATUS WITH SO_3

F. Dale Huillet, Snohomish, and L. Michael Minshull, Everett, both of Wash., assignors to Scott Paper Company, Philadelphia, Pa.

Filed Dec. 10, 1975, Ser. No. 639,226
Int. Cl.² B01D 46/04
U.S. Cl. 55—90 7 Claims

1. A process of cleaning fiber-containing apparatus having water-insoluble particulate material from the treatment of combustion flue gases deposited on the fibers, which process comprises;

treating the fibers and the particulate material with an aqueous, acidified potassium permanganate solution,

removing the aqueous acidified potassium permanganate treatment solution, followed by

treating the fibers and remaining particulate material with gaseous sulfur dioxide, and

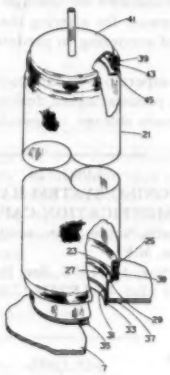
removing the sulfur dioxide treated material with water.

4,003,727

TUBULAR FILTER CONNECTOR

Leonard J. O'Dell, Louisville, Ky., assignor to American Air Filter Company, Inc., Louisville, Ky.

Filed July 2, 1975, Ser. No. 592,539
Int. Cl.² B01D 46/02
U.S. Cl. 55—377 3 Claims



1. In a baghouse arrangement for filtering particulate matter from a gaseous stream including at least one plenum having an apertured member for gas passage therethrough and at least one vertically extending tubular filter bag with one of its ends connected to said apertured member in flow-through communication with said plenum, the improvement comprising:

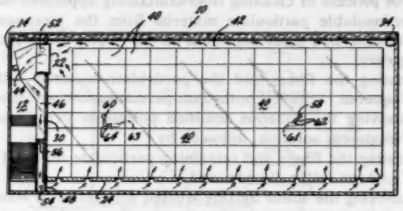
a flow-through elongated mounting member having a vertically extending portion with a radially outwardly extending flange at one end thereof in communication with said one end of said tubular filter bag, a radially inwardly extending seat at the opposed end thereof with a vertically downwardly extending portion terminating at its lower extremity, the vertically downwardly extending portion being received by the aperture in said apertured member such that the seat rests upon the periphery of the aperture, said vertically downwardly extending portion between said flange and said radially inwardly extending seat being defined by two vertically extending offset sections connected by a radially inwardly extending ledge portion; and,

said one end of said tubular filter bag having a means releasably securing said tubular filter bag to said flange of said mounting member.

4,003,728
METHOD AND APPARATUS FOR CONTROLLING THE STORAGE CONDITION OF PERISHABLE COMMODITIES IN LONG-DISTANCE TRANSPORT VEHICLES

Eric Rath, 2415 Calle Del Oro, La Jolla, Calif. 92037

Filed Oct. 9, 1974, Ser. No. 513,275
Int. Cl.² F24F 3/16
U.S. Cl. 62—78 12 Claims



1. A method of maintaining field fresh perishable agriculture commodities in optimum condition during storage and transportation comprising the steps of:

a. packing commodities in a chamber having a controllable environment;

b. forcing temperature regulated, humidified air through the floor of said chamber and upwardly through said stored commodities;

c. withdrawing air from the top of said chamber;

d. sensing circulating air for temperature and humidity;

e. circulating withdrawn air through heating, cooling, and humidifying means for altering the temperature and humidity thereof according to predetermined desired criteria;

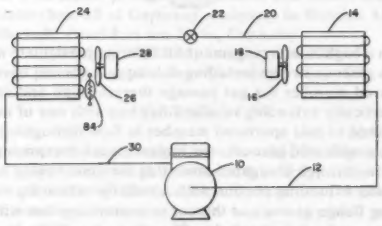
f. sensing the temperature of said packed commodities; and

g. changing the predetermined desired criteria to achieve a desired optimum storage temperature of said commodities.

4,003,729
AIR CONDITIONING SYSTEM HAVING IMPROVED DEHUMIDIFICATION CAPABILITIES

William L. McGrath, Naples, Fla., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Nov. 17, 1975, Ser. No. 632,330
Int. Cl.² F25D 17/06
U.S. Cl. 62—93 11 Claims



1. In an air conditioning system including a mechanical refrigeration unit having a fan to route air in heat transfer relationship with the evaporator and actuating means to drive said fan, a control system to increase the dehumidifying capabilities of said system comprising:

temperature responsive means to sense the temperature level of the refrigerant passing through the evaporator coil;

means to generate a control signal in response to said sensed refrigerant temperature including means to vary the magnitude of said signal as the sensed refrigerant temperature varies;

means to supply said variable magnitude control signal to said fan actuating means to vary the speed of said actuating means and thus the speed of said fan, whereby the speed of said fan is decreased as the sensed refrigerant temperature increases to decrease the flow rate of the air across the evaporator, and the speed of the fan is increased as the sensed refrigerant temperature decreases to increase the flow rate of air across the evaporator to maintain a substantially constant refrigerant temperature;

means to sense the temperature level of the air in the space being served by said air conditioning system;

means to generate a second control signal in response to said sensed air temperature including means to vary the magnitude of said second signal as the sensed air temperature varies;

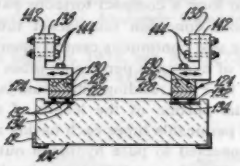
means to supply said second variable magnitude control signal to said fan actuating means to vary the speed of said fan; and

monitoring means to determine the magnitude of said second control signal including means to discontinue operation of said refrigeration unit if the magnitude of said second control signal is indicative of the air temperature having fallen below a predetermined value.

4,003,730
APPARATUS FOR MAKING GLASS FIBERS

William C. Brady, Granville; Arthur S. Warner, Hebron, and Harold D. Hankinson, Granville, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Sept. 26, 1975, Ser. No. 616,973
Int. Cl.² C03B 37/02
U.S. Cl. 65—1 19 Claims



1. Apparatus for producing molten glass streams in fiber-forming condition comprising:

a walled melting receptacle of high-temperature resistant material having at least a partially open top and a partially open bottom and in which molten glass is formed from batch material;

a feeder communicating with the melting receptacle through the bottom opening in the melting receptacle, molten glass formed in the melting receptacle flowing from the melting receptacle through the bottom opening into the feeder, the bottom of the feeder having holes through which the molten glass flows as molten streams;

a heating element extending across the interior of the receptacle and having opposite edge portions, the heating elements being electrically conductive and being positioned to be beneath the surface of a body of molten glass formed within the receptacle, and the heating element being subject to changes in its dimensions when heated;

a pair of bus bars for distribution of electrical energy effective to heat the heating element to form molten glass from the batch material, each bus bar being connected to an edge portion of the heating element;

a mounting means holding the bus bars so that at least one of the bus bars is movable to accommodate the dimensional changes in the heating element; and

means for providing electrical power to the bus bars.

4,003,731

NOZZLE FOR FLUIDS

Thomas K. Thompson, Granville, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Apr. 26, 1976, Ser. No. 680,246
Int. Cl.² C03B 37/02
U.S. Cl. 65—12 5 Claims

1. A nozzle comprising:
a. a chamber;
b. means opening into said chamber;
c. a plurality of apertures opening from said chamber for discharging a fluid;
d. a conduit abutting said chamber in open communication with said chamber and surrounding said apertures, said conduit having a rectangular cross-section with two outwardly diverging opposing walls; and,
e. a plurality of vane means positioned within said conduit.

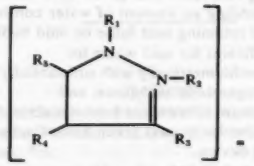
4,003,732

PYRAZOLINIUM COMPOUNDS AS HERBICIDES

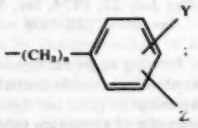
Barrington Cross, Rocky Hill, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 484,515, July 1, 1974, Pat. No. 3,925,408. This application July 28, 1975, Ser. No. 599,805
Int. Cl.² A01N 9/22
U.S. Cl. 71—92 7 Claims

1. A method for the control of undesirable plant species comprising, contacting said undesirable plant species with a herbicidally effective amount of a compound having the formula:



wherein R_1 and R_2 each represent alkyl C_1–C_4; R_4 represents a member selected from the group consisting of hydrogen, methyl, methoxy, methylthio, methylsulfinyl and methylsulfonyl; R_3 and R_5 each represent members selected from the group consisting of cycloalkyl C_3–C_7, cycloalkylmethyl C_3–C_7, methylcycloalkyl C_3–C_7, cycloalkenyl C_3–C_7, alkyl C_3–C_{11}, thienyl and



X represents an anion having a charge of from 1 to 3; n is an integer selected from 0 and 1; m is an integer selected from 1, 2 and 3; and Y and Z each represent members selected from the group consisting of hydrogen, halogen, nitro, cyano, alkyl C_1–C_4, alkoxy C_1–C_4 and CF_3.

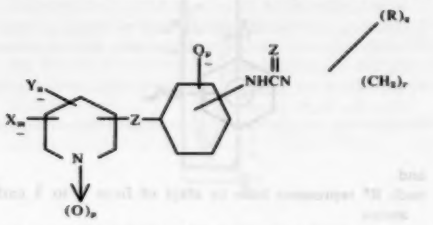
4,003,733

SUBSTITUTED PYRIDINYLOXY(THIO)PHENYL -ACETAMIDES, -UREAS AND UREA DERIVATIVES

Howard Johnston, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 435,615, Jan. 22, 1974, Pat. No. 3,931,201. This application Oct. 16, 1975, Ser. No. 623,157
Int. Cl.² A01N 9/22
U.S. Cl. 71—94 25 Claims

1. A compound corresponding to the formula:



wherein:
r represents an integer of 4 or 5;
q represents an integer of 0 to 2, inclusive;
each p independently represents an integer of 0 or 1;
each X independently represents bromo, chloro, iodo or fluoro;
m represents an integer of 0 to 4, inclusive;
each Y independently represents nitro, ZR^3, $-C(X')_3$

n represents an integer of 0 to 2, inclusive;
each Z independently represents oxygen or sulfur;
Q represents methyl, ethyl, halo, nitro or trifluoromethyl;
each X′ independently represents hydrogen or halo;
each R independently represents hydrogen or alkyl of from 1 to 3 carbon atoms;
R^3 represents alkyl of from 1 to 3 carbon atoms, and
R^4 and R^5 each independently represent hydrogen or alkyl of from 1 to 4 carbon atoms.

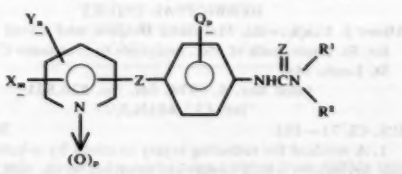
4,003,734

SUBSTITUTED PYRIDINYLOXY(THIO)PHENYL-ACETAMIDES, -UREAS AND UREA DERIVATIVES AND HERBICIDAL COMPOSITIONS AND METHODS CONTAINING SAID COMPOUNDS

Howard Johnston, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.

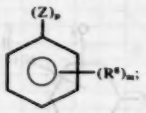
Division of Ser. No. 435,615, Jan. 22, 1974, Pat. No. 3,931,201. This application Oct. 16, 1975, Ser. No. 623,151
Int. Cl.² A01N 9/22
U.S. Cl. 71—94 52 Claims

1. A compound corresponding to the formula:



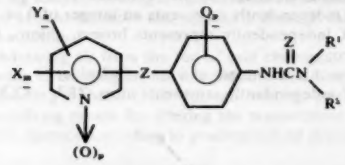
wherein:

each *p* independently represents an integer of 0 or 1;
each X independently represents bromo, chloro, iodo or fluoro;
m represents an integer of 0 to 4, inclusive;
each Y independently represents cyano
n represents an integer of 0 to 2, inclusive;
each Z independently represents oxygen or sulfur;
Q represents cyano;
R^1 represents hydrogen, alkyl of from 1 to 4 carbon atoms or alkoxy of from 1 to 4 carbon atoms;
R^2 represents alkyl of from 1 to 3 carbon atoms or

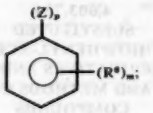


and
each R^6 represents halo or alkyl of from 1 to 3 carbon atoms.

27. The method of controlling undesired plant growth which comprises applying to plants and/or their habitats a herbicidally-effective amount of a compound of the formula:



wherein:
each *p* independently represents an integer of 0 or 1;
each X independently represents bromo, chloro, iodo or fluoro;
m represents an integer of 0 to 4, inclusive;
each Y independently represents cyano;
n represents an integer of 0 to 2, inclusive;
each Z independently represents oxygen or sulfur;
Q represents cyano;
R^1 represents hydrogen, alkyl of from 1 to about 4 carbon atoms or alkoxy of from 1 to 4 carbon atoms;
R^2 represents alkyl of from 1 to 3 carbon atoms or



and
each R^6 represents halo or alkyl of from 1 to 3 carbon atoms
in the presence of an inert carrier therefor.

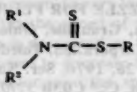
4,003,735

COMPOSITIONS AND METHODS FOR REDUCING HERBICIDAL INJURY

Albert J. Czajkowski, Maryland Heights, and David E. Schafer, St. Louis, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Nov. 4, 1974, Ser. No. 520,521
Int. Cl.² A01N 9/12
U.S. Cl. 71—101 **30 Claims**

1. A method for reducing injury to crops by α-haloacetanilide herbicides which comprises applying to the soil, crop, or crop seed an effective safening amount of a compound of the formula



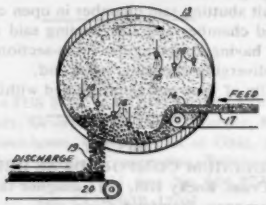
wherein R is C_{1-6} alkyl, C_{2-6} alkenyl or haloalkenyl, phenyl, cyanomethyl, cyclohexyl, cyclohexenyl, benzyl or benzyl substituted with halo, nitro or trifluoromethyl groups; R^1 is C_{1-6} alkyl, C_{2-6} alkenyl, phenyl or phenyl substituted with halo, nitro or lower alkyl groups and R^2 is hydrogen, C_{1-6} alkyl or C_{2-6} alkenyl or haloalkenyl.

4,003,736

METHOD FOR PREPARING DRY-COLLECTED FUME FOR USE IN METALLURGICAL FURNACES

John W. Kreiger, and Charles E. Jablonski, both of Bethlehem, Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed July 1, 1975, Ser. No. 592,288
Int. Cl.² C22B 1/08
U.S. Cl. 75—3 **3 Claims**



1. A method for preparing strong, stable green balls, suitable for charging into metallurgical furnaces, from dry-collected iron-bearing fume containing not less than a total of about 8% combined amount of lime (CaO) and magnesia (MgO), formed in basic oxygen steelmaking furnaces, said method comprising:
a. charging said fume onto a balling device,
b. agglomerating said fume into green balls on said balling device while adding an amount of water continuously to said fume and retaining said fume on said balling device for a time sufficient for said water to:
i. combine stoichiometrically with substantially all of said lime and magnesia in said fume, and
ii. leave an amount of moisture between about 7 and 12% to act as a binder in said green balls discharged from said balling device.

4,003,737

METHOD OF AGGLOMERATING WITH ADDITIVES IN THE BRIDGING LIQUID

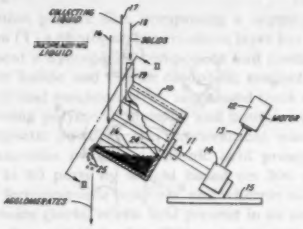
Bruce F. Caswell, Ann Arbor, Mich., and I. E. Puddington, Ottawa, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Continuation of Ser. No. 295,295, Oct. 5, 1972, abandoned.
This application July 22, 1974, Ser. No. 490,285
Int. Cl.² C22B 1/08
U.S. Cl. 75—3 **3 Claims**

1. A process for forming agglomerates of aluminum oxide from finely divided aluminum oxide particles in a two-phase liquid system, comprising:
a. forming a suspension of aluminum oxide particles having a particle size in the range of from 10 to 250 microns, in a first liquid which is lyophobic with respect to aluminum oxide particles;
b. adding to said suspension a second liquid consisting essentially of an aqueous nitric acid solution containing from 0.3 to 10 percent by weight of nitric acid and from

0.5 to 20 percent by weight of aluminum nitrate, said second liquid being lyophilic with respect to said aluminum oxide particles and being immiscible with said first liquid whereby to form a two-phase liquid system containing said particles in suspension;

c. agitating the two-phase liquid system to effect repeated collisions of said aluminum oxide particles and thereby forming in said system a dispersion of agglomerates of said aluminum oxide particles and said second liquid, and during said agitating, simultaneously initiating a chemical reaction between said nitric acid and aluminum oxide on the surfaces of said aluminum oxide particles to form aluminum nitrate;



d. discontinuing said agitating, maintaining said agglomerates immersed in the liquid phase and permitting said chemical reaction to proceed for a period of time effective to form aluminum nitrate on the surfaces of the aluminum oxide particles in the agglomerates, and then separating the agglomerates from the liquid phase;

e. drying said agglomerates to drive off water and to crystallize said aluminum nitrate which bonds together the aluminum oxide particles in the agglomerates, the drying step being carried out at a rate effective to prevent cracking of the agglomerates; and

f. calcining the dried agglomerates to transform said aluminum nitrate to aluminum oxide, whereby to obtain agglomerates of aluminum oxide particles bonded together by aluminum oxide binder.

4,003,738

METHOD OF PURIFYING ALUMINUM

Alex R. Valdo, Phoenix, Ariz., assignor to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 240,864, April 3, 1972, which is a continuation of Ser. No. 26,752, April 8, 1970, abandoned, and a continuation-in-part of Ser. No. 168,363, Aug. 2, 1971, Pat. No. 3,846,122, which is a continuation-in-part of Ser. No. 26,751, April 8, 1970, abandoned. This application Dec. 10, 1975, Ser. No. 639,263

The portion of the term of this patent subsequent to Nov. 5, 1991, has been disclaimed.

Int. Cl.² C22B *21/00*

U.S. Cl. 75—68 C **11 Claims**

1. A process for purifying aluminum carbide containing aluminum formed by decomposition of an alkyl aluminum compound, comprising the steps of:

a. melting the aluminum under a molten fluoride cover flux;

b. bubbling through the body of molten aluminum a stream of gas containing chlorine but otherwise essentially inert, until the carbide content of the aluminum is essentially removed; and,

c. separating the treated aluminum from the flux and any dross formed thereon and casting the separated aluminum to thereby form an aluminum product substantially free of aluminum carbide.

4,003,739

COPPER EXTRACTION BY ARC HEATER

Floyd E. Camp, Trafford, and Chikara Hirayama, Murrysville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 16, 1975, Ser. No. 587,762

Int. Cl.² C22B *15/00*

U.S. Cl. 75—72 **1 Claim**

1. A process for the production of copper from copper sulfide ore comprising the steps of:

striking an electric arc in an axial gap between generally hollow, cylindrical electrodes spaced along a common axis which form an arc chamber;

passing a non-conductive gas consisting essentially of oxygen-containing gas selected from the group consisting of oxygen and air forcefully through the gap into the arc chamber and through the arc to produce an arc heated plasma jet while forming a downstream reaction zone;

injecting into the reaction zone a stream of powdered copper sulfide material to effect a reaction between said material and said oxygen-containing gas at a temperature ranging from about 2000° K to about 3500° K to produce molten copper and sulfur-dioxide; and

cooling the copper to below its melting point.

4,003,740

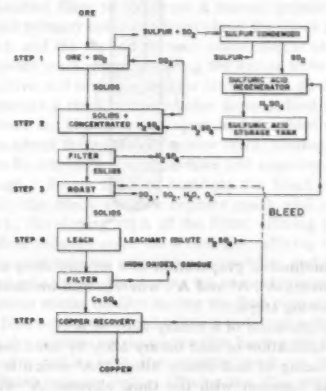
RECOVERY OF COPPER FROM COPPER SULFIDE ORES CONTAINING COPPER AND IRON

Dale K. Huggins, Golden, Colo.; Lowell R. Anderson, Morristown, and Fred J. Gefri, Hackettstown, both of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Jan. 6, 1976, Ser. No. 646,807

Int. Cl.² C22B *15/08*

U.S. Cl. 75—117 **15 Claims**



1. A cyclic process for recovering copper from sulfide ores containing copper and iron which comprises:

a. reacting the sulfide ore with sulfur dioxide gas at a tem-

perature of at least about 500° C., thereby forming elemental sulfur, magnetite and a copper sulfide

b. condensing and removing the elemental sulfur from the reaction mixture,

c. reacting the residual solids with concentrated sulfuric acid at a temperature of about 180° to 500° C., thereby forming copper sulfate and sulfur dioxide gas,

d. recycling the sulfur dioxide gas to step (a)

e. separating the solids comprising magnetite and copper sulfate from the liquid phase,

f. roasting the separated solids at a temperature of about 400° to 900° C.,

g. leaching the roasted solids with an aqueous solution comprising water or dilute sulfuric acid, thereby solubilizing the copper sulfate,

h. separating the solids comprising magnetite and gangue from the liquid phase and

i. recovering copper from the solubilized copper sulfate.

4,003,741

METHOD OF PREPARATION OF SEMICONDUCTING COMPOUNDS

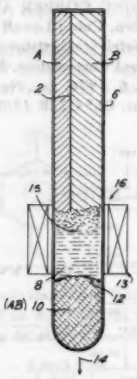
Jean Gallet; Jean Marine; Bernard Pelliciari, and Bernard Schaub, all of Grenoble, France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Dec. 9, 1975, Ser. No. 639,112

Claims priority, application France, Dec. 24, 1974, 74.42769

Int. Cl.² C22C *1/02*

U.S. Cl. 75—135 **7 Claims**



1. A method of preparation of a ternary alloy composed of the elements A^1, A^2 and A^3, wherein said method consists of the following steps:

the preparation of a binary alloy A^1A^2,

the purification of said binary alloy by zone melting,

the placing of said binary alloy A^1A^2 which is in the solid state together with the third element A^3 within a container in the presence of a solvent,

the crystallization of the ternary alloy by melting all the elements $A^1A^2 + A^3$ and recrystallization in the presence of the solvent.

4,003,742

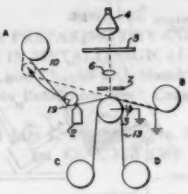
VELOCITY COMPENSATION FOR BEAD BYPASS WITH SPEED REDUCTION

Earl V. Jackson, Penfield; Roger G. Teumer, Fairport, and LeRoy Baldwin, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 476,185, June 4, 1974, Pat. No. 3,950,088. This application Nov. 17, 1975, Ser. No. 632,435

Int. Cl.² G03G *15/24*

U.S. Cl. 96—1 PE **5 Claims**



1. A photoelectrophoretic imaging method comprising

a. providing a pair of electrodes having inside and outside surfaces, wherein one of said electrodes is a web;

b. coating a layer of an imaging suspension comprising electrically photosensitive pigment particles in an electrically insulating carrier liquid on at least a portion of the inside surface of at least one of said electrodes before the inside surfaces of said electrodes are brought into contact with each other to form a nip;

c. advancing successive portions of the inside surfaces of said electrodes into contact with each other to form a nip, wherein a bead of accumulated imaging suspension forms at the entrance to the nip;

d. applying an electrical field across the imaging suspension between said electrodes;

e. exposing said suspension at the nip to an imagewise pattern of activating radiation at least when the inside surfaces of said electrodes are in contact at the nip with the suspension therebetween;

f. advancing at least said web electrode relative to the nip region so that at least the bead of accumulated imaging suspension is advanced beyond the nip region when the inside surfaces of the electrodes are separated;

g. separating the inside surfaces of said electrodes at the nip to a spacing sufficient to allow the bead of accumulated imaging suspension to pass the nip region;

h. compensating for motion during said separating step (g) whereby the advancing rate of velocity for said web electrode remains constant by moving at least one roller, always in continuous contact with the outside surface of said web electrode, in a fixed approximately elliptical path which always causes reduction of the wrap angle formed by said advancing web electrode in contact with said other electrode to cause separation of the inside surfaces of said electrodes without changing the advancing velocity of the web electrode; and

i. reducing the advancing velocity of said other electrode when the inside surfaces of said electrodes are being separated or while they are separated whereby said other electrode is advanced at a slower velocity than its prior velocity.

4,003,743

PROCESS FOR PRODUCTION OF MOTION PICTURE FILM WITH SOUND TRACK CONTAINING p-TOLUENESULFONIC ACID AND GLACIAL ACETIC ACID

Goro Akashi; Masaaki Fujiyama, and Akira Kasuga, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation-in-part of Ser. No. 345,823, March 28, 1973, abandoned. This application May 19, 1975, Ser. No. 578,957
Claims priority, application Japan, Mar. 30, 1972, 47-31943
Int. Cl.[2] G03C 7/24, 5/14; G03G 19/00
U.S. Cl. 96—4 13 Claims

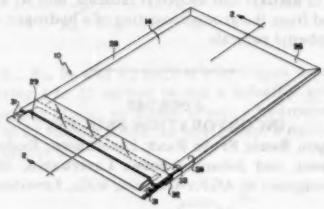
1. In a motion picture film comprising a support having coated thereon (1) a photographic emulsion layer having as its main component a hydrophilic component and containing at least one silver halide and (2) an oleophilic magnetic sound track coated on said emulsion layer, said sound track comprising a film-forming polymeric material and containing one or more ferromagnetic powders, the improvement wherein the sound track contains p-toluene sulfonic acid present in an amount of 3 to 60 parts by weight based on 300 parts by weight of said ferromagnetic powders, and wherein said sound track also contains glacial acetic acid present in an amount of at least 9 parts by weight based on 300 parts by weight of said ferromagnetic powders.

4,003,744

PHOTOGRAPHIC PRODUCTS WITH PHOTOSENSITIVE LAYERS OF SAME SPECTRAL SENSITIVITY AND DIFFERENT SPEED

Peter O. Kliem, Weston, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 312,827, Dec. 7, 1972, abandoned. This application Aug. 2, 1974, Ser. No. 494,197
Int. Cl.[2] G03C 5/54, 1/76, 7/00, 1/40
U.S. Cl. 96—29 D 23 Claims



1. A composite photographic diffusion transfer process film unit which comprises a plurality of sequential layers arranged in substantially parallel planar relationship including, in combination:

a dimensionally stable layer having one side serving as an external surface of said film unit,

a composite photosensitive unit comprising:

a first layer comprising a particulate dispersion of photosensitive silver halide grains possessing first means particle size and exhibiting gamma value within the range of about 1.7 to 3.0; and

a second layer comprising a particulate dispersion of photosensitive silver halide grains possessing a second mean particle size less than said first mean particle size, being spectrally sensitive within the sensitivity range of said first layer silver halide grains and combined with a diffusion transfer process dye image-forming material having a spectral absorption characteristic within the spectral sensitivity range of the said silver halide grains of said first and second layers, said second layer exhibiting a gamma value within the range of about 1.7 to 3.0;

said gamma values of said first and second layers differing from each other by at least 0.25;

the diffusion transfer speed of said first layer being greater than that of said second layer by an amount equivalent to about four to seven stops;

said first layer being contiguous with said second layer and being positioned intermediate said second layer and the exposure surface of said film unit;

said first layer being substantially free of diffusion transfer process dye image-forming material;

said composite photosensitive unit exhibiting a predetermined gamma within a range of 1.1 to 1.7;

receptor means including a layer adapted to receive diffusion transfer process dye image-forming material diffusing thereto as a function of the point-to point degree of said photosensitive unit's exposure to incident actinic radiation; and

means for providing a processing composition intermediate said photosensitive unit and said receptor means.

4,003,745

METHOD FOR IDENTIFYING COLOR SEPARATION FILM

William L. Blanks, Dallas, Tex., assignor to Blanks Engraving Company, Dallas, Tex.

Filed Feb. 2, 1976, Ser. No. 654,513
Int. Cl.[2] G03C 5/04; G03F 1/00
U.S. Cl. 96—41 3 Claims

1. A process to identify and register film in color separation photography comprising the steps of: positioning a color identifying tape next to the article to be copied, said tape having a black positive register mark thereon with colored backgrounds shaded in the three primary colors spaced in three quadrants about the black positive register mark, said backgrounds having negative indicia positioned therein to indicate the color of the background, and said tape further having a negative register mark in spaced relationship with the positive register mark, said negative register mark having colored positive indicia shaded in each primary color on clear background spaced in corresponding quadrants to the quadrants on the colored background of the black positive register mark; photographing the article to be copied and said positive and negative register marks through a first filter to substract a first primary color from a first primary color quadrant about the black positive register mark and the first primary color indicia about the negative register mark; photographing the article to be copied and said positive and negative register marks through a second filter to substract a second primary color from a second primary color quadrant about the black positive register mark and the second primary color indicia about the negative register mark; photographing the article to be copied and said positive and negative register marks through the third filter to substract a third primary color from a third primary quadrant about the black register mark and the third primary color indicia about the negative register mark; photographing the article to be copied and said positive and negative register marks through a fourth filter to highlight the black color to produce only the black positive register mark and negative register mark; developing each of the films; affixing the film having the first primary color on a first flat; affixing the film having the second primary color on a second flat, and aligning the register marks on the film having the second primary color with the register marks on film having the first primary color; affixing the film having the third primary color on a third flat, and aligning the register marks on the film having the first and second primary colors with the register mark on the film having the third primary color; affixing the film with black color on a fourth flat, and aligning the register marks on the film having the black color with the register marks on the film having first, second and third primary colors thereon, wherein each said flat comprises a transparent sheet.

4,003,746

ORGANIC HETEROCYCLIC AND THIOARYL PHOSPHINES IN SILVER HALIDE EMULSIONS AND DEVELOPERS THEREFOR

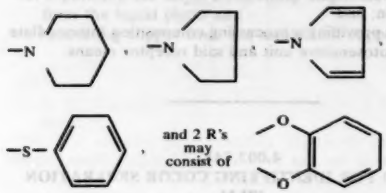
John Howard Bigelow, Rochester, N.Y., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed July 1, 1975, Ser. No. 592,262

Int. Cl.² G03C *5/24, 1/34, 1/06*

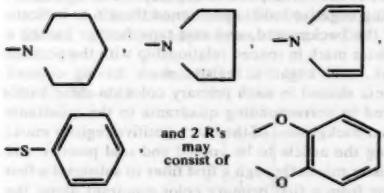
U.S. Cl. 96—66.3 **9 Claims**

1. A light-sensitive silver halide photographic material comprising a support bearing a layer of a silver halide emulsion containing in said layer or in a contiguous layer a tertiary phosphine of the formula PR_3 wherein at least one R but not more than 2 R's being the same, is a member of the groups



and any remaining one R, or 2 R's being the same, is selected from the group consisting of alkyl, alkoxy, aryl, aryloxy, and aralkyl.

8. A silver halide photographic developer solution which contains at least one silver halide developing agent and a tertiary phosphine of the formula PR_3 wherein at least one R, but not more than 2 R's being the same, is a member of the groups



and any remaining R one R or 2 R's being the same is consist of selected from the group consisting of alkyl, alkoxy, aryl, aryloxy, and aralkyl; said tertiary phosphine being present in an amount of 0.01 to 0.3 grams per liter of developer solution.

4,003,747

PHOTOSENSITIVE AZIDE COMPOUND CONTAINING COLOR-FORMING ELEMENT

Takahiro Tsunoda, Funabashi; Minoru Ozutsumi, Tokyo; Shigeo Maeda, Tokyo; Susumu Suzuka, Tokyo, and Hidetoshi Komiya, Tokyo, all of Japan, assignors to Hodogaya Chemical Co., Ltd. and Oji Paper Co., Ltd., both of Tokyo, Japan

Filed Sept. 4, 1975, Ser. No. 610,400

Claims priority, application Japan, Sept. 9, 1974, 49-102911

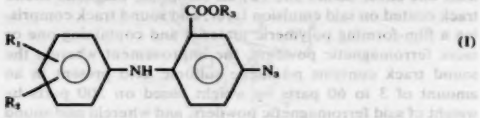
Int. Cl.² G03C *1/58, 1/72*

U.S. Cl. 96—75 **9 Claims**

1. A photosensitive color-forming element comprising a support, and a photosensitive color-forming layer coated on said support, said layer containing therein an admixture of:

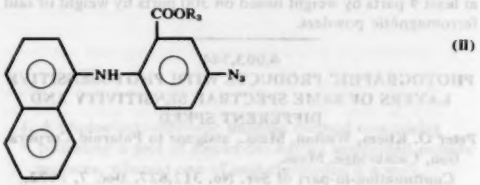
A. at least one color-forming coupler selected from the group consisting of 2-hydroxynaphthalene, 1-hydroxynaphthalene, 2,3-dihydroxynaphthalene, 4-methoxy-1-naphthol, 2-hydroxy-3-naphthanilide, 2,4-dichloro-1-naphthol, phenol, 2,4-dihydroxybenzene, 1,4-dihydroxybenzene, 4-acetylphenol, p-cresol, m-phenylenediamine, 5-methyl-2-acetylphenol, N,N-dimethyl-m-aminophenol, N,N-diethylaniline, N-ethyl-N-benzylaniline, N-methyldiphenyl amine, N,N-bis-cyano-ethylaniline, N,N-dibenzylaniline, acetacetic anilide, 1-phenyl-3-methyl-5-pyrazolone, 1-(3'-aminophenyl)-3-methyl-5-pyrazolone, 1-(4'-chlorophenyl)-3-methyl-5-pyrazolone, 1-nathyl-3-methyl-5-pyrazolone, 1-methyl-2-phenylindole, 2-phenylindole, 1,2-dimethylindole, 2,3,3-trimethylindoline, 1,2,3,3-tetramethylindoline, 4-hydroxycoumarin and 4-cyanomethyl-nitrobenzene, and

B. at least one photosensitive azido compound selected from the group consisting of the azido compounds of the formula (I) and the azido compound of the formula (II):



(I)

and



(II)

wherein R_1 represents a substituent selected from the group consisting of halogen atoms, and alkoxyl, diethylamino and hydroxyl radicals, R_2 a substituent selected from the group consisting of alkoxyl and hydroxyl radicals, and R_3 a substituent selected from the group consisting of a hydrogen atom and alkyl and phenyl radicals.

4,003,748

INCORPORATION PROCESS

Hans Langen, Bonn; Erwin Ranz, Leverkusen; Rudolf Meyer, Leverkusen, and Johannes Sobel, Leverkusen, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Mar. 3, 1975, Ser. No. 554,716

Claims priority, application Germany, Mar. 7, 1974, 2410914

Int. Cl.² G03C *1/84, 1/40*

U.S. Cl. 96—84 UV **8 Claims**

1. A process for the production of photographic layers containing emulsified substances in heterogeneous distribution comprising the step of emulsifying the substances in solubilized form into a hydrophilic phase in the presence of an oilformer compound and applying the emulsion formed to a substrate, the emulsified substances are selected from the group consisting of couplers, UV-absorbers, white toners or stabilizers (to dissolve said substances, wherein the improvement comprises providing a substantially diffusion-resistant, substantially water-insoluble, substantially non-coupling oil-former compound which is of the formula

$$R_1 - CO - CH_2 - R_2$$

wherein

R_2 represents a cyano group or the group COR_3,

R_1 and R_3 represents alike or different groups selected of linear or branched chain alkyl with up to 20 carbon atoms, cyclohexyl and cyclopentyl groups, aryl groups, aralkyl groups, alkoxy groups, aroxy groups and aralkoxy

groups; the total number of carbon atoms in R_1 and R_2 amounting to at least 6, if R_1 an R_3 both are alkyl or together complete an alkyl substituted or aryl substituted or annelated heterocyclic, heteroaromatic or aromatic ring and the total number of carbon atoms in R_1 and R_2 amounting to at least 10, if R_1 represents alkoxy and R_2 represents alkoxy or aralkoxy,

which oilformer compound is capable of stabilizing the photographic layers against the damaging influence of aldehyde-containing or releasing hardening agents.

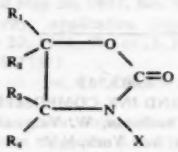
4,003,749

HEAT-DEVELOPABLE LIGHT-SENSITIVE MATERIALS USING THE REACTION PRODUCT OF A ORGANIC SILVER SALT AN A N-HALO-OXAZOLIDINONE

Takao Masuda, and Nobuyoshi Sekikawa, both of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

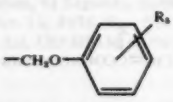
Filed July 15, 1975, Ser. No. 596,130
Claims priority, application Japan, July 15, 1974, 49-81353
Int. Cl.² G03C *1/02, 1/34*
U.S. Cl. 96—114.1 **7 Claims**

1. A heat-developable light-sensitive material comprising a support having therein or in one or more layers thereon (a) an organic silver salt which is comparatively stable to light, is substantially colorless and reacts with a reducing agent on heating in the presence of exposed silver halide to produce silver images, (b) a light-sensitive silver halide, and (c) a reducing agent, with said light-sensitive silver halide comprising the reaction product of a part of the organic silver salt (a) and an N-halo compound represented by the following formula (I):

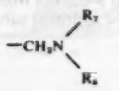


(I)

wherein R_1, R_2, R_3 and R_4 each is a hydrogen atom; an alkyl group having 1 to 22 carbon atoms; a haloalkyl group having 1 to 22 carbon atoms; an amino group; a hydroxyalkyl group having 1 to 22 carbon atoms; an allyl group; a naphthyl group; a benzyl group; a



group in which R_5 is a hydrogen atom, a halogen atom, an alkyl group, an alkylthio group, an amino group or an alkylamino group; a benzyloxy group; an aryl group; a haloaryl group; an alkylaryl group; an alkoxyaryl group; an $-OR_6$ group in which R_6 is a hydrogen atom, an alkyl group, an allyl group, an aryl group or an alkoxyaryl group; a



group in which R_7 and R_8 each is a hydrogen atom, an alkyl group, an aryl group or an allyl group; a cyclohexyl group; a $-CH_2OR_9$ group in which R_9 is a naphthyl group; or a $-CH_2R_{10}$ in which R_{10} is a morpholino group, a piperadino group or an alkylthio group; and X is a chlorine atom or a bromine atom.

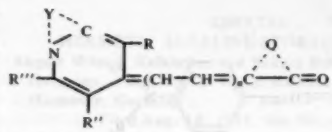
4,003,750

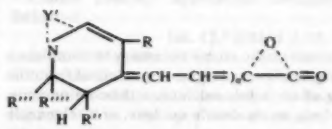
SILVER HALIDE EMULSION CONTAINING PHOTOGRAPHIC SENSITIZING DYES

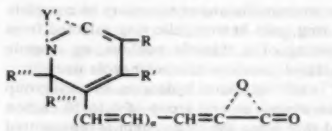
Donald W. Heseltine; Donald W. Kurtz; Derek D. Chapman, and James K. Elwood, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

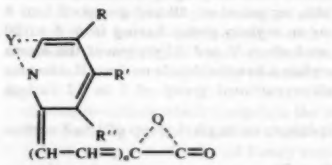
Filed May 3, 1973, Ser. No. 356,980
Int. Cl.² G03C *1/24, 1/16*
U.S. Cl. 96—129 **19 Claims**

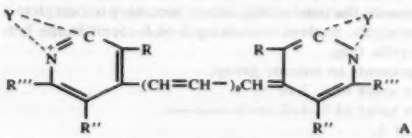
1. A photographic silver halide composition containing at least one dye selected from those having the formulas

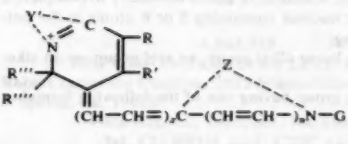


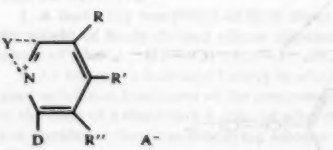












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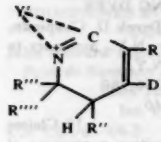
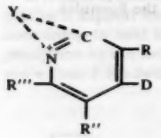
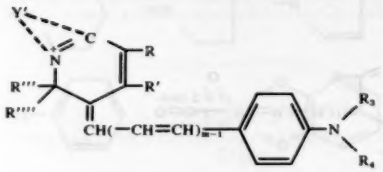






wherein:

Y represents the nonmetallic atoms necessary to complete a heterocyclic ring, said heterocyclic ring selected from the class consisting of an indole nucleus, a thiazole nucleus, an oxazole nucleus, an imidazole nucleus, or a selenazole nucleus;

R′ represents the nonmetallic atoms necessary to complete a heterocyclic ring, said heterocyclic ring selected from the class consisting of a thiazole nucleus, an oxazole nucleus, an imidazole nucleus or a selenazole nucleus;

R, R′, R″ and R‴ each represents hydrogen, an alkyl group of 1 to 8 carbon atoms, an aryl group of 6 to 20 carbon atoms provided that when the ring system is represented by Y′, R can also represent an alkoxy group of 1 to 8 carbon atoms or an aryloxy group having from 6 to 20 carbon atoms, and when Y and Y′ represent the atoms required to complete a benzimidazole nucleus R, can also represent an alkoxycarbonyl group of 3 to 12 carbon atoms;

R⁗ represents hydrogen or an alkyl group of 1 to 8 carbon atoms;

a has a value of 1 or 2;

Q represents the nonmetallic atoms necessary to complete a heterocyclic nucleus containing 5 or 6 atoms in the heterocyclic ring;

A^- represents an anionic group;

b has a value of 1, 2 or 3;

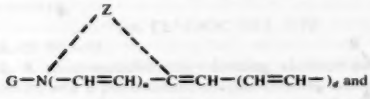
x has a value of 0, 1, 2 or 3;

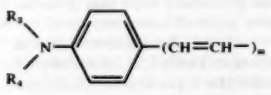
n is 0 or 1;

Z represents the nonmetallic atoms necessary to complete a heterocyclic nucleus containing 5 or 6 atoms in the heterocyclic ring;

G represents a lower alkyl group, an aryl group, or an alkenyl group;

D represents a group having one of the following formulas





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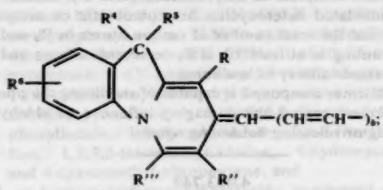
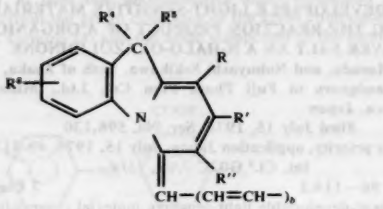




wherein:

n, Z, R, R′, R″, R‴ and G are as previously defined;

d and b has a value of 0, 1, 2 or 3; m is 1 or 2;

R_3 and R_4 each represents a lower alkyl group;

R^4 and R^5 each represents a lower alkyl or cycloalkyl group; and,

R^6 represents hydrogen a lower alkyl group, cyano, a lower alkoxy group, an aryl group of 6 to 20 carbon atoms, a halogen or a nitro group.

4,003,751

COATING AND INK COMPOSITIONS

Charles H. Carder, Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

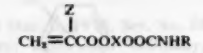
Filed Sept. 5, 1974, Ser. No. 503,476

Int. Cl.² C09D *11/00*

U.S. Cl. 106—20 **11 Claims**

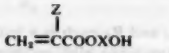
1. A coating or ink composition comprising:

a. from 1 to 80 weight percent of at least one monofunctional acrylate-urethane of the formula:



wherein Z is hydrogen or methyl; X is divalent alkylene of 1 to 10 carbon atoms, cycloalkylene of 5 to 12 carbon atoms; and R is alkyl of 1 to 10 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, or aryl of 6 to 12 carbon atoms;

b. from 20 to 99 weight percent of at least one polyfunctional acrylate-urethane of the group: i. polycaprolactone-polyurethane-polyacrylate oligomers, said oligomers being the reaction product of polycaprolactone polyol having a molecular weight of from 130 to 20,000, organic polyisocyanate and hydroxyl substituted ester of the formula:



ii. diurethane-diacrylate, said compound being the reaction product of two moles of a hydroxyl substituted ester of the formula:

$$CH_2=\underset{\displaystyle Z}{\underset{|}{C}}COOXOH$$

and one mole of an organic diisocyanate, or,

iii. urea-urethane-polyacrylate oligomer said oligomer being the reaction product of a hydroxyl substituted ester of the formula:

$$CH_2=\underset{\displaystyle Z}{\underset{|}{C}}COOXOH$$

an organic diisocyanate and a hydroxylamine of the formula:

HOR'NHR

wherein R' is a linear or branched divalent alkylene of 1 to 12 carbon atoms, cycloalkylene of 5 to 12 carbon atoms, or arylene of 6 to 12 carbon atoms and Z and X are as hereinabove defined;

c. from 0 to 50 weight percent of at least one polyfunctional acrylate crosslinker; and

d. from 0 to 30 weight percent of at least one monofunctional acrylate.

4,003,752

MAGNESIA CEMENT COMPOSITION, PROCESS OF ITS MANUFACTURE, AND COMPOSITE COMPRISING SAME

Susumu Isohata; Kazutaka Watabe; Morio Shimoshimizu, all of Fuji, and Toshiyuki Iwaisako, Saitama, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed May 20, 1975, Ser. No. 579,068

Claims priority, application Japan, May 22, 1974, 49-56621; May 22, 1974, 49-56622; July 8, 1974, 49-77371; July 8, 1974, 49-77372

Int. Cl.² C04B *9/04*

U.S. Cl. 106—105 **4 Claims**

1. A magnesia cement composition comprising 42 to 94% by weight of active magnesia, 5 to 38% by weight of magnesium sulfate, and 1 to 20% by weight of pulp.

4,003,753

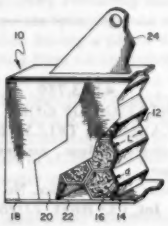
ELECTRODE STRUCTURE FOR ELECTRICAL ENERGY STORAGE DEVICE

John C. Hall, Granada Hills, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Mar. 15, 1976, Ser. No. 667,001

Int. Cl.² H01M *43/00*

U.S. Cl. 429—199 **11 Claims**



1. In a rechargeable electrical energy storage device containing an electrolyte molten at the operating temperature of the device and electropositive and electronegative electrode structures spaced apart in said electrolyte, the improvement wherein at least one of said electrode structures comprises a unitary multi-cell structure including:

a plurality of wall members having edges and axially extending surfaces which form a plurality of cells having at least one open end and a cell cross-sectional open area of at least about 0.04 cm^2, said edges of said wall members and the open end of said cells being aligned in a common plane to form a planar face, the axially extending surfaces of said wall members being substantially perpendicular to said planar face;

a body of electrochemically active material disposed in said cells, said material being a solid at the operating temperature of said device; and

an electrolyte-permeable member affixed to said wall members and covering the open end of said cells for retaining said active material in said cells.

4,003,754

HERMETIC ALKALINE STORAGE BATTERY

August Winsel, Kelkheim, and Eckart Buder, Kriftel, both of Germany, assignors to Varta Batterie Aktiengesellschaft, Hannover, Germany

Filed Aug. 14, 1975, Ser. No. 604,496

Claims priority, application Germany, Nov. 7, 1974, 2452064

Int. Cl.² H01M *4/38*

U.S. Cl. 429—149 **23 Claims**

1. In an alkaline storage battery cell which is hermetically sealed, and which includes a negative electrode having higher capacity than the positive electrode, the improvement wherein

the positive electrode is constructed and arranged to provide a capacity which is limiting during discharging, and

the negative electrode includes additive selected from the group of reduced Raney metal and Raney metal alloy of one or more metals in Group VIII of the periodic table,

the additive being present in a quantity sufficient to conduct the maximum polarity reversal current.

16. In the method of producing an alkaline storage battery cell which is hermetically sealed, which includes a negative electrode having higher capacity than the positive electrode and which is subject to polarity reversal during deep discharging

the improvement which comprises the step of

incorporating in the negative electrode additive selected from the group of reduced Raney metal and Raney metal alloy of one or more metals in Group VIII of the periodic table in a quantity sufficient to conduct the maximum polarity reversal current.

4,003,755

DISPERSION-HARDENED LEAD ALLOY

Robert Lawrence Gustison, 2982 Wilson School Lane, Sinking Spring, Pa. 19608

Filed Aug. 22, 1975, Ser. No. 606,966

Int. Cl.² H01M *2/28;* **C22C** *11/00*

U.S. Cl. 429—178 **11 Claims**

1. A lead alloy comprised of from about 5% to about 35% by weight of finely divided silicon dispersed in a continuous phase of lead.

9. An improved lead-acid battery in which the metallic lead used to form at least some of the components of the battery is in the form of a dispersion-hardened alloy of lead and a minor but significant hardness-modifying amount of minus 80 mesh silicon.

4,003,756

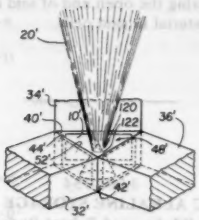
DEVICE FOR CONVERTING SUNLIGHT INTO ELECTRICITY

Eugene Abrams, Franklin Square, N.Y., assignor to Solar Dynamics Corporation, Franklin Square, N.Y.

Continuation-in-part of Ser. No. 407,662, Oct. 18, 1973, abandoned, which is a continuation-in-part of Ser. No. 393,168, Aug. 30, 1973, abandoned. This application Mar. 7, 1974, Ser. No. 448,887

Int. Cl.² H01L *31/04*

U.S. Cl. 136—89 PC **6 Claims**



1. A device for converting sunlight into electricity using silicon solar cells comprising wall means bounding a pyramidal cell compartment having an entrance opening thereinto, Fresnel lens means operatively arranged in an interposed position between the sun and said cell compartment so as to beam sunlight through said compartment entrance opening in a selected concentrated form which has a circular shape in cross-section and which approximates in size that of said compartment entrance opening, three said silicon solar cells electrically connected to each other operatively arranged on said cell compartment wall means in facing relation to each other and oriented lengthwise of said cell compartment so as to intercept said sunlight beamed through said compartment entrance opening, and heat exchange means operatively arranged in heat exchange relation to said silicon solar cells to dissipate an extent of heat from said concentrated sunlight impinging thereon to obviate any damage to said cells, whereby an optimum amount of electricity is generated by said device as a function of said concentrated sunlight input.

4. A device for converting sunlight into electricity using silicon solar cells comprising wall means bounding a cell compartment having an entrance opening thereinto, a centrally located conical light-reflecting member in said compartment, Fresnel lens means operatively arranged in an interposed position between the sun and said cell compartment so as to beam sunlight through said compartment entrance opening in a concentrated conical shape onto said conical light-reflecting member, at least three said silicon solar cells electrically connected to each other operatively arranged on said cell compartment wall means in encircling relation about said conical light-reflecting member, and heat exchange means operatively arranged in heat exchange relation to said silicon solar cells to dissipate an extent of heat from said concentrated sunlight impinging thereon to obviate any damage to said cells.

4,003,757

SILVER-II-OXIDE FOR GALVANIC ELEMENTS

Walter Karl Lux, Horn, Austria, and Tsvetko Chobanov, Frankfurt am Main, Germany, assignors to Varta Batterie Aktiengesellschaft, Hannover, Germany

Filed June 23, 1975, Ser. No. 589,562

Claims priority, application Germany, June 27, 1974, 2430910

Int. Cl.² H01M *6/00*

U.S. Cl. 429—219 **12 Claims**

1. In a process for producing silver II-oxide for galvanic elements, the improvement which comprises

adding an oxidant to an alkaline solution containing undissolved metallic silver powder, thereby oxidizing the powder to silver-II-oxide, the oxidant being potassium peroxidisulfate.

12. A material for use in primary cells produced by the steps of

forming a suspension of metallic silver powder in an alkaline solution, and

adding an oxidant to the solution to oxidize the powder into silver-II-oxide, the oxidant being potassium peroxidisulfate.

4,003,758

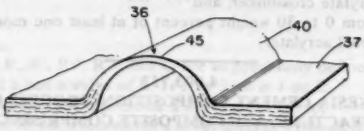
BATTERY SEPARATOR WITH POROUS BODY AND FUSED RIB

Nigel Innes Palmer, Lexington, and Don O'Neil Grammer, Scituate, both of Mass., assignors to W. R. Grace & Co., Cambridge, Mass.

Filed Dec. 21, 1972, Ser. No. 317,107

Int. Cl.² H01M *2/14*

U.S. Cl. 264—119 **8 Claims**



1. A method of embossing and differentially compressing a fibrous mat comprising applying heat and pressure substantially uniformly to said mat by means of engaging two opposite faces of said mat between two calendering rolls with opposed mating surfaces that have female grooves and male ridges with lands therebetween extending therearound, said opposed surfaces being substantially evenly spaced where the grooves and ridges are and where the lands are and thereafter applying additional heat and pressure to regions of said mat corresponding generally to where said mat was engaged by said grooves and ridges while restricting the application of said additional heat and pressure from regions of said mat corresponding generally to where said mat was engaged by said lands by means of passing said mat between a second two calender rolls with opposed mating surfaces that have female grooves and male ridges with lands therebetween extending therearound with said female grooves and male ridges engaging said mat and applying said additional heat and pressure, said female grooves and male ridges being sized such that the mat is suspended between said female grooves and male ridges without touching the intermediate land portions of said second calender rolls.

4,003,759

ION IMPLANTATION OF GOLD IN MERCURY CADMIUM TELLURIDE

Toivo Koehler, Lexington, Mass., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Mar. 1, 1976, Ser. No. 662,293

Int. Cl.² H01L *21/265*

U.S. Cl. 148—1.5 **7 Claims**

1. A method of introducing acceptor impurities into a region of a mercury cadmium telluride body, the method comprising:

implanting gold ions into the region; and

heat treating the mercury cadmium telluride body at a temperature of between about 150° C and about 250° C for a time of between about 2 minutes and about 40 minutes.

4,003,760

METHOD OF APPLYING PROTECTIVE COATINGS TO METAL PRODUCTS

Wolfgang Labenski, Leimen; Heinz Paul Schapitz, Walldorf, and Hans-Peter Wessel, Heidelberg, all of Germany, assignors to Mecano-Bundy GmbH, Heidelberg, Germany

Filed Mar. 1, 1974, Ser. No. 447,105
Claims priority, application France, Mar. 9, 1973, 73.08593
Int. Cl.² C23F 7/26
U.S. Cl. 148—6.2 8 Claims

1. In the method of providing a metal body with a protective coating that is resistant to chemical and mechanical attack and that comprises successive layers of zinc, chromate and synthetic resin applied to the metal body, in which the zinc is galvanically coated onto the metal body to have a finely crystalline, highly homogenous structure,

the improvements comprising

1. applying a chromate layer over the zinc layer by immersing the metal body in a chromic acid solution having a pH value over 2 and containing a reducing agent to form a largely trivalent chromate layer;
2. rinsing and drying the chromate layer to form a layer containing water of crystallization;
3. applying a layer of fluoroplastic synthetic resin dispersed in a liquid over the dried chromate layer; and then
4. thermally treating the metal body to dry the fluoroplastic layer and cause it to interlock with and adhere to the chromate layer and remove said liquid therefrom while preserving water of crystallization in the chromate layer.

4,003,761

PROCESS FOR THE PRODUCTION OF SPRAYED PHOSPHATE COATS ON IRON AND STEEL

Hans Gotta, Weiden, and Franz-Heinz Schroll, Hurth, both of Germany, assignors to Gerhard Collardin GmbH, Cologne-Ehrenfeld, Germany

Filed Apr. 2, 1975, Ser. No. 564,556
Claims priority, application Germany, Apr. 13, 1974, 2418118; Feb. 7, 1975, 2505172
Int. Cl.² C23F 7/08
U.S. Cl. 148—6.15 R 10 Claims

1. A process for forming a phosphate coating on a corrodible ferric surface, thereby rendering said surface corrosion resistant which comprises spraying said surface for 0.5 to 5 minutes with a solution having a pH of 4.3 to 6.5 consisting essentially of 1 to 20 g./liter of an orthophosphate salt of a cation selected from the group consisting of alkali metals and ammonium, 0.05 to 5 g./liter of an oxidizing agent or reducing agent accelerator, 0.05 to 1 g./liter of a short-chain alkylolamine having from 2 to 4 carbon atoms in each alkylol group from 0.01 to 1.5 g./liter of at least one non-ionic wetting agent and the remainder water at a temperature in the range of about 40° to 95° C.

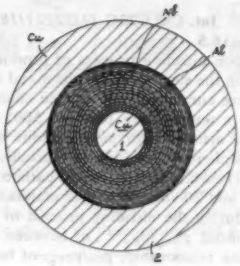
9. A substantially anhydrous composition which when diluted with water to 1,000 parts by weight is useful for rendering corrodible ferrous surface corrosion resistant consisting essentially of 1 to 20 parts by weight of an orthophosphate salt of a cation selected from the group consisting of alkali metals and ammonium, 0.05 to 5 parts of an oxidizing or reducing accelerator, 0.05 to 1 part of a C_2-C_4 alkanolamine, and 0.01 to 1.5 parts of a non-ionic wetting agent, and an acid or alkali to provide a pH between 4.3 and 6.5 when said composition is dissolved in water to 1,000 parts by weight.

4,003,762

PROCESS FOR THE PRODUCTION OF SUPERCONDUCTOR WIRES OR CABLES OF Nb_3Al AND SUPERCONDUCTOR WIRES OR CABLES OBTAINED THEREBY

Sergio Ceresara, Via Magalotti 4, Novara; Giancarlo Sacerdoti, Via Montagne Rocciose 62, Rome, and Nicola Sacchetti, Largo Ottavio Manilio 7, Frascati, all of Italy

Filed Mar. 17, 1975, Ser. No. 559,628
Claims priority, application Italy, Mar. 22, 1974, 49510/74
Int. Cl.² H01L 39/24
U.S. Cl. 148—11.5 R 6 Claims



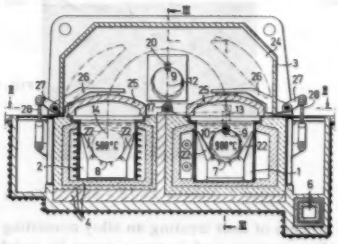
1. A process for the production of superconductor wires of Nb_3Al characterized in that it comprises forming at least one assembly of superimposed sheets of Nb and sheets of Al, inserting said assembly of superimposed sheets in at least one copper container so as to avoid direct contact between the superimposed Al sheet faces and the copper container, subjecting said copper container with the sheets inserted therein to a plastic deformation processing so as to obtain a reduction in the thickness of the Al sheet to a value of less than about 1.5 μm and finally subjecting the product thus processed to heat treatment at a temperature between 800° and 1000° C.

4,003,763

METHOD OF AND PLANT FOR PATENTING STEEL WIRE BUNDLES

Rolf Kohlgrüber, Cologne, Germany, assignor to Ofenbaugesellschaft Berg u. Co. m.b.H., Cologne, Germany

Filed Apr. 7, 1975, Ser. No. 565,444
Claims priority, application Germany, Oct. 26, 1974, 2450955
Int. Cl.² C21D 1/46
U.S. Cl. 148—15 2 Claims



1. A method of patenting a loosened steel wire bundle in a steel wire patenting plant having a cooling vat and a heating furnace, which includes in combination the step of first preheating the wire bundle in the cooling vat to a desired temperature in said cooling vat, introducing the thus pre-heated wire bundle into said furnace and heating the same to a desired elevated temperature, and subsequently returning the thus

heated wire bundle to said cooling vat for cooling said wire bundle to the temperature in said cooling vat to, and simultaneously, at least approximately maintain the desired pre-heating temperature in said cooling vat.

4,003,764

PREPARATION OF AN ε-CARBON NITRIDE SURFACE LAYER ON FERROUS METAL PARTS

Joachim Wünning, Warmbronn, Germany, assignor to Firma J. Aichelin, Korntal near Stuttgart, Germany

Filed May 8, 1974, Ser. No. 467,913

Claims priority, application Germany, May 17, 1973, 2324918

Int. Cl.² C23C *11/12, 11/18*

U.S. Cl. 148—16.5 **14 Claims**

1. The carbon nitriding process of producing an ε-carbon nitride layer on the surface of ferrous metal articles in a gaseous atmosphere contained in a furnace chamber, comprising contacting at a temperature between 500° and 650° C said ferrous metal articles with said gaseous atmosphere, said gaseous atmosphere comprising (i) partially dissociated ammonia, and (ii) carbon monoxide and carbon dioxide in a total of between 2 and 20 volume %, and maintaining said gaseous atmosphere during the nitriding process to have an average nitriding potential, $p_{NH_3}/p_{H_2}^{1.5}$, of between 0.5 and 5, and a partial pressure relationship, p_{CO}/p_{CO_2}, of between 1 and 10; wherein,

p_{NH_3} is the partial pressure of ammonia in the furnace chamber;

p_{H_2} is the partial pressure of the hydrogen in the furnace chamber;

p_{CO} is the partial pressure of carbon monoxide in the furnace chamber;

p_{CO_2} is the partial pressure of the carbon dioxide in the furnace chamber

said gaseous atmosphere having been formed by introducing (a) an ammonia-containing gas, and (b) a combusted gas which is a mixture of carbon monoxide, carbon dioxide and nitrogen, into said furnace chamber, said ammonia-containing gas (a) being in a ratio to said combusted gas (b) of between 1:0.3 and 1:3.

4,003,765

HEAT TREATMENT OF COBALT BASE ALLOYS

James H. Davidson, Varennes-Vauzelles, France, assignor to Creusot-Loire, Paris, France

Continuation-in-part of Ser. No. 316,716, Sept. 20, 1972, abandoned. This application Oct. 1, 1974, Ser. No. 511,093

Claims priority, application France, May 4, 1972, 72.15818

Int. Cl.² C22F *1/02*

U.S. Cl. 148—20.3 **2 Claims**

FIG. 7

Alliage 1. 1200°C 2h TE + 850°C 16h TA

1. A process of heat treating an alloy consisting in: preparing an alloy consisting of, in percentages by weight,

from 5 to 30% nickel

from 18 to 25% chromium,

from 5 to 17% in total of one or more of tungsten, tantalum, and molybdenum,

from 0.10 to 0.30% carbon,

from 50 to 200 ppm boron,

from 0 to 0.3% iron

from 0 to 2% manganese,

from 0 to 1% hafnium,

from 0 to 1% lanthanum,

from 0 to 1% yttrium,

from 0.5 to 2% in total of titanium and/or niobium,

the balance being cobalt and incidental impurities, solution heat treating the alloy in a protective atmosphere at from 1150° to 1250° C for at least 1 hour, and rapid cooling and then age hardening for from 12 to 24 hours at from 750° C to 850° C, to effect carbide precipitation of MC carbides, M being titanium or niobium.

4,003,766

WELDING MATERIALS FOR ALUMINUM-COATED STEEL

Yoshinori Ito, Nishinomiya; Mutsuo Nakanishi, Amagasaki; Masamichi Nakakoji, Nagaokakyo; Masahiko Ikeda, Ashiya, and Tadashi Ito, Nara, all of Japan, assignors to Sumitomo Metal Industries, Ltd., Japan

Filed Feb. 21, 1975, Ser. No. 551,649

Int. Cl.² B23K *35/34*

U.S. Cl. 148—24 **7 Claims**

1. Welding materials for aluminium-coated steel comprising on weight basis less than 1.5% of Si, and less than 1.0% of Mn, 2 to 15% of CaF_2, and 15 to 50% of a mixture of oxides having a basicity ranging from 1.0 to 12.5, the balance being essentially Fe.

4,003,767

PROCEDURE FOR THE PRODUCTION OF PERMANENT MAGNETIC SINTER BODIES USING A TERNARY COBALT-LANTHANOID COMPOUND

Kurt Bachmann, Nussbaumen, Switzerland, and Emanuel de Lamotte, Brussels, Belgium, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Continuation of Ser. No. 303,595, Nov. 3, 1972, abandoned. This application Apr. 7, 1975, Ser. No. 565,561

Claims priority, application Switzerland, Dec. 27, 1971, 18903/71

Int. Cl.² C21D *1/04*; H01F *1/08*

U.S. Cl. 148—105 **3 Claims**

1. A method for producing a permanent magnetic sinter body which comprises:

a. admixing particles of a first binary alloy of cobalt and a first lanthanoid element, $Ln^{(1)}$, having the formula $Co_5Ln^{(1)}$ with particles of a second binary alloy of cobalt and a second lanthanoid element, $Ln^{(2)}$, having the formula $Co_5Ln^{(2)}$,

b. admixing a different cobalt-samarium alloy with said first and said second binary alloys of cobalt as a sintering additive,

c. and thereafter sintering at a temperature 800° – 1350° C, said particulate mixture, whereby a permanent magnet is formed,

wherein said lanthanoid elements $Ln^{(1)}$ and $Ln^{(2)}$ are different from one another and are selected from the group consisting of yttrium, lanthanum and lanthanoid having an atomic number of 58 to 71; wherein the ratios of the binary alloys are selected so that the proportion of the elements in said sintered body correspond to the formula $Co_uLn_x^{(1)}Ln_{1-x}^{(2)}$, wherein $3.5<u<5$ and $0<x<1$; said cobalt-samarium alloy being composed of 46–65% by weight samarium and 54–35% by weight of cobalt based on the total weight of the alloy, and wherein the weight ratio of said sintering additive is chosen such that the total content of the cobalt in the final mixture is 62–64 wt. percent.

4,003,768
METHOD FOR TREATING MAGNETIC ALLOY TO INCREASE THE MAGNETIC PERMEABILITY

Ronald L. Anderson, Mountain View, Calif.; Eugene E. Castellani, Putnam Valley, N.Y.; Patrick M. McCaffrey, Mahopac Falls, N.Y., and Lubomyr T. Romankiw, Briarcliff Manor, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 12, 1975, Ser. No. 549,401
Int. Cl.² C21D *1/04*
U.S. Cl. 148—108 **17 Claims**

1. A method of increasing the magnetic permeability of a body of magnetic alloy having an easy axis and a hard axis, and containing from about 20 to 95% by weight of nickel, from about 5 to 80% by weight of iron, and up to 20% by weight of an element selected from the group consisting of copper, manganese, molybdenum, titanium, silicon, chromium, beryllium and tungsten wherein said body of magnetic alloy has a thickness of from about 0.25 to about 5 microns and is a film containing in the lateral plane 1–12 μ wide gaps in the magnetic material which comprises:

a. subjecting said body to a magnetic field greater than the sum of the demagnetizing field and coercive force of said body and being at least about 100 Gauss oriented along said hard axis;

b. said body being maintained during step (a) at or above the temperature needed to deposit the magnetic alloy on a substrate, wherein said temperature is in the range between about 200° and below about 250° C; provided however, that the body of magnetic alloy is not maintained at a temperature and for a time sufficient for causing the magnetic alloy to undergo recrystallization to such an extent as to lose its anisotropy and further provided said body is subjected to the magnetic field for about ½ hour to about 6 hours.

4,003,769
METHOD OF MAKING NON-RETENTIVE Al-Ni-Co-Fe ALLOY

Albert Roy Davis, Green Cove Springs, Fla., assignor to Bio-Magnetics International, Inc., Jacksonville, Fla.

Filed Oct. 11, 1974, Ser. No. 514,311
Int. Cl.² H01F *1/00*
U.S. Cl. 148—121 **5 Claims**

1. A method for converting a high magnetic retentivity, high magnetic conductivity aluminum-nickel-cobalt-iron alloy consisting essentially of 8–12% aluminum, 14–28% nickel, 5–24% cobalt, balance iron, to a substantially magnetically non-retentive alloy consisting essentially of the steps of:

a. heating said alloy to a temperature in the range 1400°–1500° F for a period of from 24 to 36 minutes, said heating temperatures and times selected to yield a product having a magnetic retentivity of about 1/1000 gauss or less in applied fields of up to 1500 gauss; and

b. rapidly quenching said heated alloy.

4,003,770
PLASMA SPRAYING PROCESS FOR PREPARING POLYCRYSTALLINE SOLAR CELLS

Richard J. Janowiecki, Dayton; Michael C. Willson, Waynesville, and Douglas H. Harris, Dayton, all of Ohio, assignors to Monsanto Research Corporation, St. Louis, Mo.

Filed Mar. 24, 1975, Ser. No. 561,405
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976
Int. Cl.² H01L *21/203, 31/00*
U.S. Cl. 148—174 **6 Claims**

1. A process for preparing solar cells comprising the steps of:

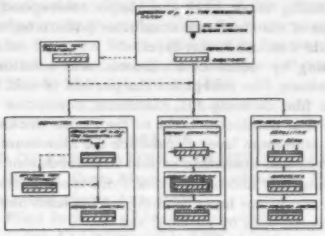
a. generating a flowing plasma gas stream,

b. heating p- or n-doped silicon particles by injection into said plasma stream,

c. discharging said heated particles from said plasma stream onto a substrate providing a polycrystalline silicon film,

d. during steps (b) and (c) providing a suitable atmosphere surrounding said particles to inhibit oxidation,

e. preparing a p-n junction in said polycrystalline silicon



film by diffusion or ion-implantation of a dopant of opposite polarity or type into said film or by forming a layer on said polycrystalline silicon film by plasma spraying doped silicon particles of opposite polarity or type, and

f. providing electrical conductors to control the flow of electricity produced by illuminating said p-n junction.

4,003,771
SOLID GRAIN FUELS CONTAINING POLYPHOSPHONITRILICS DIFLUORIDE FOR CHEMICAL LASERS

Hyman R. Lubowitz, Hawthorne, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed Aug. 7, 1975, Ser. No. 602,629
Int. Cl.² C06B *45/04*
U.S. Cl. 149—17 **2 Claims**

2. A solid grain fuel composition for a chemical laser comprising:

a. an oxidizing salt containing fluorine;

b. a polymer fuel comprising polyphosphonitrilic nitrilic difluoride; and, as optional ingredients,

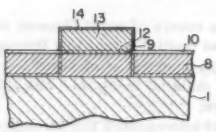
a. an alkali metal fluoride sequestering agent; and

b. an augmenting fuel.

4,003,772
METHOD FOR PREPARING THIN FILM INTEGRATED CIRCUIT

Masanobu Hanazono, and Osamu Asai, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Feb. 18, 1975, Ser. No. 550,366
Claims priority, application Japan, Feb. 18, 1974, 49-18587
Int. Cl.² H01L *21/441*
U.S. Cl. 156—656 **10 Claims**



8. A method for forming a thin film integrated circuit comprising a substrate, a first conductor layer on said substrate and a second conductor layer on said first conductor layer, each of said first and second conductor layers comprising an aluminum conductor pattern and adjacent insulation of equal thickness, the conductor pattern in said first conductor layer contacting the conductor pattern in said second conductor

layer in at least one cross-connectional area, said method comprising:

forming a first aluminum film on said substrate;

forming on said first aluminum film a first anodizing mask comprising an anodized film formed in an ordinary solution and a photoresist film on said anodized film, said first anodizing mask having a shape corresponding to the shape of the aluminum conductor pattern to be produced in said first conductor layer;

anodizing by means of a chromic acid solution said first aluminum film except for the portion of said first aluminum film defining the aluminum conductor pattern of said first conductor layer to the entire thickness of said first aluminum layer to produce the aluminum conductor pattern and insulation of said first conductor layer;

removing said anodizing mask from those portions of said first conductor layer defining said at least one cross-connectional area by etching; and

forming said second conductor layer.

9. The method of claim 8, wherein said second conductor layer is formed by:

forming a second aluminum film overlying the entire surface of said first conductor layer;

forming on said second aluminum film a second anodizing mask comprising an anodized film formed in an ordinary solution and a photoresist layer on said anodizing film; and

anodizing by means of a chromic acid solution said second aluminum film except for the portions of said second aluminum film defining the aluminum conductor pattern of said second conductor layer to the entire thickness of said second aluminum film.

4,003,773

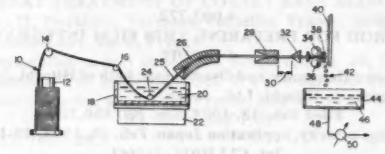
METHOD OF PREPARING GRAPHITE FIBERS OF ULTRA-SHORT LENGTH AND NARROW SIZE DISTRIBUTION

Michael Anthony Grable, Frostburg, Md., assignor to Hercules Incorporated, Wilmington, Del.

Filed Mar. 2, 1976, Ser. No. 663,164

Int. Cl.² B26D 7/08; B02C 23/00

U.S. Cl. 156—155 **8 Claims**



1. A method for preparing fibers of ultra-short length and narrow size distribution from multi-filament tow comprising the steps of:

a. providing a source of multi-filament tow;

b. passing said multi-filament tow through a bath of liquid impregnating material at elevated temperature, said impregnating material being one which is solid at ambient temperature;

c. passing said impregnated tow through a die sized to control the quantity of material impregnating the tow and to compact the filaments of the tow into a closely packed bundle;

d. cooling the compact tow to solidify the impregnating material therein and to convert the tow to a rigid form;

e. cutting said rigid tow to produce wafer-thin disks therefrom;

f. stripping the impregnating material from said wafer-thin disks with a solvent to yield fibers of ultra-short length and narrow size distribution; and

g. removing solvent from the fibers.

4,003,774

STABILIZATION OF TOWS OF FILAMENTARY MATERIAL

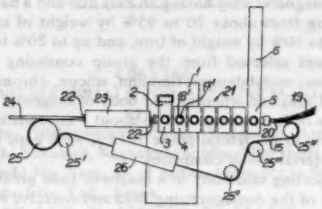
Jean-Pierre Lebet, Montreux, and Jöel Daniel Ducommun, Chavannes, both of Switzerland, assignors to Baumgartner Papiers S.A., Switzerland

Filed Sept. 20, 1974, Ser. No. 507,804

Claims priority, application Switzerland, Sept. 24, 1973, 13675/73

Int. Cl.² B29H 9/02; B04H 3/08

U.S. Cl. 156—180 **9 Claims**



1. A process of stabilizing a tow of filamentary dielectric material, comprising:

a. providing a tow of filamentary dielectric material, and a plurality of resonant cavities coupled in series to transfer electromagnetic energy therebetween, and each having a pair of opposed apertures for providing communication between the interior and the exterior thereof, said plurality of cavities being aligned with their respective apertures along a common straight line to define in use a path of travel for the tow of filamentary dielectric material, and wherein each of said cavities includes means for adjusting the resonant frequency thereof to a common frequency between about 3×10^8 and 3×10^{11} Hertz;

b. developing a spatially contained electric field within said plurality of resonant cavities and oriented substantially parallel to the straight line defining the path of advance of the tow, and having a frequency between about 3×10^8 and about 3×10^{11} Hertz;

c. advancing the tow through the plurality of cavities through the spatially contained electric field contained the rein, along a direction parallel to the field and along the straight line along which the apertures are aligned to effect sufficient dielectric heating within the tow to thermally fuse dielectric filaments within the tow; and

d. simultaneously supporting the tow along an entire portion thereof within the spatially contained electric field contained within the plurality of cavities as the tow is being advanced therethrough and heated, to prevent deformation of the heated portion of the tow.

3. An apparatus for stabilizing a tow of filamentary dielectric material, comprising:

a. a plurality of resonant cavities in series, each of said cavities including means for adjusting the resonant frequency to a common frequency between about 3×10^8 and 3×10^{11} Hertz, and

each of said cavities having a pair of opposed apertures for providing communication between the interior and exterior thereof, said plurality of cavities aligned with their respective apertures along a common straight line to define in use a path of travel, for a tow of filamentary dielectric material, through the plurality of series connected cavities;

b. means for coupling said cavities in series to transfer electromagnetic energy therebetween;

c. an elongated tube disposed extending through the plurality of aligned apertures for supporting the tow as it is advanced in use through the plurality of series connected

cavities, said elongated tube comprised of a low permittivity material to prevent heating by electromagnetic energy within said cavities;

d. a driven flexible endless conveyor belt of low permittivity material having a portion disposed through said elongated tube, and which advances through said elongated tube when driven;

e. drive means for driving said flexible endless conveyor to advance it through said elongated tube;

f. means receptive in use of a tow of filamentary dielectric material and coactive with a portion of said endless conveyor belt for wrapping the tow of filamentary dielectric material in said conveyor belt as said belt is driven, whereby the tow of filamentary dielectric material wrapped in said endless conveyor belt is advanced through said elongated tube; and

g. means for developing an electric field having a frequency between about 3×10^8 and about 3×10^{11} Hertz within said cavities and substantially parallel to the path of advance of the tow wrapped in said endless conveyor belt to effect dielectric heating within the tow in use as it is advanced by said drive means through said elongated tube.

4,003,775

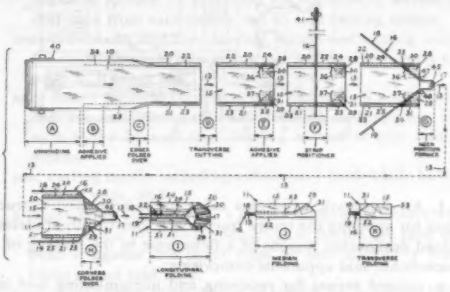
METHOD FOR MAKING A GARMENT

Richard A. Batt, and Charles B. Green, both of Lewisburg, Pa., assignors to International Paper Company, New York, N.Y.

Continuation of Ser. No. 322,722, Jan. 11, 1973, abandoned. This application Dec. 5, 1974, Ser. No. 529,713

Int. Cl.² B31F *1/00*

U.S. Cl. 156—226 **3 Claims**



1. In a method for making a garment (**11**) from a continuous web (**10**) of material, during movement of the web (**10**) along a feed path (**13**), which comprises the steps of: directing the web (**10**) along the feed path (**13**); cutting the web in a predetermined direction to form a blank (**15**); providing a strip (**16**) of material having a generally V configuration above the blank (**15**) with: a center portion (**17**) of the strip (**16**) protruding from the blank (**15**), end portions (**18**) and (**19**) of the strip (**16**) protruding from opposite sides of the blank, and leg portions (**33** and **34**) of the V configured strip (**16**), between the center portion (**17**) and the end portions (**18** and **19**) thereof, being positioned adjacent opposed corner portions (**28** and **29**) of the blank; folding the opposed corner portions (**28** and **29**) of the blank (**15**) over the adjacent leg portions (**33** and **34**) of the strip (**16**) and into overlying relationship with portions of the body of the blank (**15**) on the other side of the leg portions of the strip; and securing the corner portions (**28** and **29**) to the underlying body portions of the blank (**15**) to maintain the strip (**16**) in a fixed relationship with the blank; the improvement in providing the strip (**16**) with a generally V-configuration above the blank (**15**), which comprises:

positioning the strip (**16**) across the blank (**15**), so that the strip extends in a direction perpendicular to the blank's direction of movement along the feed path (**13**), with the end portions (**18** and **19**) of the strip (**16**) protruding from the opposite sides of the blank (**15**); and

then moving the center portion (**17**) of the strip (**16**) with a depending member (**45**) in the blank's direction of movement along the feed path (**13**) and through two spaced guides (**47** and **48**) located along the feed path between the opposite sides of the blank (**15**), so that: the strip (**16**) has the generally V-configuration, its center portion (**17**) protrudes from the blank (**15**), and its leg portions (**33** and **34**) are positioned adjacent the opposed corner portions (**28** and **29**) of the blank (**15**).

4,003,776

METHOD OF FABRICATING A DEMOUNTABLE ROD

Richard D. Barnes, Costa Mesa, Calif., assignor to The Conolon Corporation, Santa Ana, Calif.

Filed June 18, 1974, Ser. No. 480,380

Int. Cl.² B29D *3/02*; **B29C** *17/08*

U.S. Cl. 156—242 **5 Claims**

1. The method of fabricating a demountable rod comprising the steps of:

a. forming a tapered fiberglass tube having a thickened central portion with an outwardly thickened wall;

b. cutting the tube in two at the large end of the thickened portion forming a tapered butt portion and a tip portion having the thickened portion at its large end;

c. providing a cylindrical sleeve;

d. sizing the large end of the thickened portion to receive the sleeve thereover;

e. fixing the sleeve on the sized end of the thickened portion with the sleeve projecting rearwardly therefrom;

f. coating the small end of the butt portion with a release agent;

g. placing a molding material in the sleeve; and

h. inserting the small end of the butt portion in the projecting end of the sleeve and allowing the molding material to harden forming a demountable joint.

4,003,777

METHOD OF FORMING A LAMINATED STRUCTURE

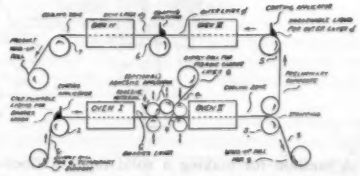
Robert G. Eddy, 20 Casablanca Court, Elnora, N.Y. 12065

Continuation of Ser. No. 416,247, Nov. 15, 1973, abandoned, and a continuation-in-part of Ser. No. 667,181, Sept. 12, 1967, Pat. No. 3,562,043. This application Sept. 8, 1975, Ser. No. 610,924

The portion of the term of this patent subsequent to Feb. 9, 1988, has been disclaimed.

Int. Cl.² B29D *7/02*

U.S. Cl. 156—246 **8 Claims**



1. A method of forming a flexible artificial leather product comprising the steps of:

forming a synthetic resinous intermediate layer on a moving temporary support having a surface of predetermined smoothness thereby forming the surface of said interme-

diate layer contacting said support to said predetermined smoothness, said intermediate layer which, when solidified, is substantially impervious to penetration by preselected outer layer materials and is adherent to a fibrous substrate and an outer layer after solidification;

then moving a fibrous substrate having interconnecting interstices throughout its body into contact with the exposed surface of said intermediate layer on said moving temporary support while at least the exposed surface of said intermediate layer is in a formable condition;

then pressing said intermediate layer on said temporary moving support into said fibrous substrate to force said intermediate layer into the surface of said substrate while preventing the intermediate layer from substantially filling the interstices throughout the substrate;

solidifying said intermediate layer, while maintaining said first named surface at said predetermined smoothness, to adhere said exposed surface of said intermediate layer to said substrate and thereby prevent the interstices of said substrate from being filled by subsequent layers coated onto the smooth first names surface of said intermediate layer;

separating said temporary support and said intermediate layer, said separating and solidifying steps occurring in any desired sequence;

forming a synthetic resinous outer layer capable of solidifying into a flexible, water vapor permeable layer on the smooth first named surface of said intermediate layer; and

solidifying said outer layer to form a flexible, water vapor permeable outer layer adhering to the smooth first named surface of said intermediate layer.

4,003,778

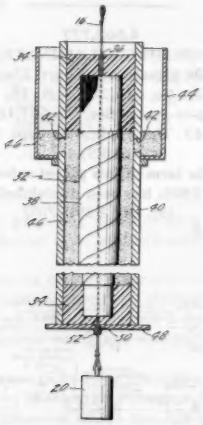
METHOD OF MAKING SLENDER ROD FOR FISHING RODS

Donald F. Phillips, West Granby, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 519,883, Oct. 31, 1974, Pat. No. 3,953,637. This application Sept. 15, 1975, Ser. No. 613,770

Int. Cl.² B29D *3/02, 31/00;* **B29G** *7/00*

U.S. Cl. 156—289 **11 Claims**



1. A method for making a solid tapered fiber-reinforced resin matrix composite rod having a high aspect ratio comprising:

forming a plurality of resin-impregnated fibers into a handleable green compact having the shape of a solid tapered composite rod of high aspect ratio;

completely encasing said green compact within an embracing flexible, releasable layer;

placing said green compact encased by said layer, within a rigid tube in spaced relation to walls thereof;

filling space between said encased compact and said tube with particulate material to apply uniform peripheral contact pressure to said compact along the length thereof; and

heating said green compact to harden said resin.

4,003,779

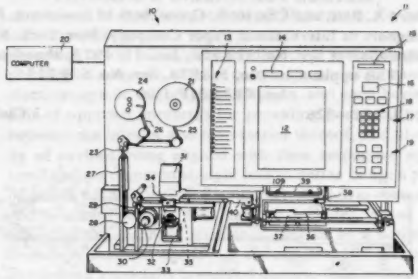
MICROFICHE MOUNTER

Augustus W. Griswold, Rush; Boris W. Haritonoff, Geneseo, and Angus W. Westkirk, Springwater, all of N.Y., assignors to Dynak, Inc., Rochester, N.Y.

Filed May 12, 1975, Ser. No. 576,796

Int. Cl.² B26D *5/00*

U.S. Cl. 156—353 **46 Claims**



1. An automatic apparatus using preprogrammed instructions for applying the image frames of a filmstrip to predetermined destination regions of a fiche base in the making of a microfiche, said apparatus comprising:

a. control means for receiving and implementing said instructions;

b. a transfer device for receiving and holding a predetermined length of said filmstrip, said predetermined length being determined by said instructions as a variable number of said image frames;

c. means responsive to said control means for advancing said filmstrip by a predetermined and variable extent into said transfer device to position said predetermined length of said filmstrip in said transfer device according to said instructions;

d. means for cutting said filmstrip in the inter-frame region behind and adjacent to said predetermined length of said filmstrip;

e. means for supporting said base for movement relative to said transfer device;

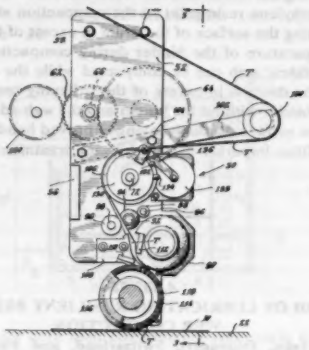
f. means responsive to said control means for moving said base supporting means according to said instructions to bring said base into a predetermined one of a plurality of possible relationships with said transfer device for accurately positioning said predetermined destination region of said base in registry with said predetermined length of said filmstrip; and

g. means for pressing said predetermined length of said filmstrip from said transfer device accurately into engagement with said destination region of said base for securing said predetermined length of said filmstrip to said base.

4,003,780
TAPE DISPENSING APPARATUS

Robert Cohn, Millbrae, Calif., assignor to Champion International Corporation, Stamford, Conn.

Filed Mar. 26, 1976, Ser. No. 670,835
Int. Cl. ²B32B 31/00
U.S. Cl. 156—519 3 Claims



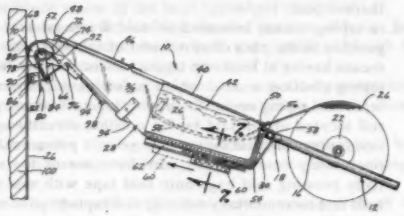
1. Tape dispensing apparatus comprising:
means for continuously feeding a substantially planar tape having an adhesive surface from a supply roll,
means for cutting said piece of tape into discrete lengths as said tape is continuously fed by said feeding means,
said tape feeding means including a draw roll engaging the adhesive surface of said tape for frictionally advancing said tape from said supply roll to said cutting means,
means between said tape feeding means and cutting means for rigidifying said tape as it is being fed continuously just prior to it being cut,
said means for rigidifying said tape including a cooperating concave and convex roller for forming said tape into a V as it is fed by said tape feeding means to said cutting means,
said cutting means including a stationary knife blade having a shear edge, and
a rotary knife blade having a planar surface in contact with the tape just prior to its being cut to flatten the tape and push it against the shear edge of said stationary knife blade to cut said tape,
said rotary knife blade being mounted on a rotary knife holder having a convex circumference in contact with the adhesive surface of the tape to feed the tape rapidly about the knife holder, and
means for transporting said cut length of tape and applying it to a sheet of material,
said tape transporting means including a vacuum roll connected to a source of negative pressure for receiving tape with its adhesive side out from the convex circumference of said rotary knife holder and pressing said tape on said sheet of material.

4,003,781
TAPING GUN

Roger W. Holsten, 1012 W. 10th St., North Platte, Nebr. 69101

Filed May 5, 1976, Ser. No. 683,255
Int. Cl.² B32B 31/00
U.S. Cl. 156—526 11 Claims

1. A tapping tool comprising,
a support means having rearward and forward ends,
a container mounted on said support means adapted to receive a cement material therein,
said container having a rearward wall, a forward wall, spaced apart side walls, a bottom wall and a closable top wall,
said container having a first tape opening formed therein between rearward wall and said top wall, said container having a second tape opening formed therein between said front wall and said top wall,
means for supporting a roll of tape material on said support means adjacent the rearward end thereof so that said tape material may pass into said container through said first opening, thence adjacent said rearward wall, thence adjacent said bottom wall, thence adjacent said forward wall, thence outwardly through said second opening, said cement material in said container being normally positioned above said tape material so that a layer of cement material is placed on said tape material as said tape material is pulled through said container,

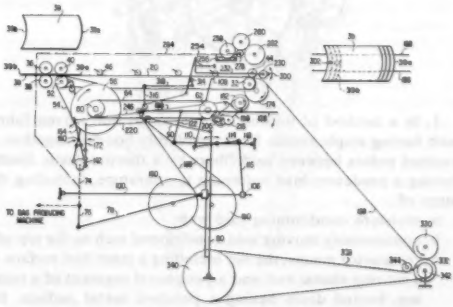


a first roller means operatively rotatably mounted at the forward end of said container adapted to have the tape material with cement thereon pass at least partially thereabout and onto a wall surface as the tape material is applied thereto,
and a tape cutter assembly pivotally mounted at the forward end of said container adjacent said first roller,
said tape cutter assembly being movable between a first non-cutting position to a second cutting position, said tape cutter assembly having a blade mounted thereon,
means normally yieldably urging said tape cutter assembly to its said cutting position,
and means on said tape cutter assembly for selectively maintaining said blade out of engagement with the tape material when said tape material is being applied to the wall surface.

4,003,782
APPARATUS FOR PRODUCING A PACKAGE OF IMBRICATED BAGS

Walter M. Farrelly, Wilmington, Del., assignor to Vac-Pac Manufacturing Co., Baltimore, Md.

Filed May 30, 1975, Ser. No. 582,099
Int. Cl.² B32B 31/10; B65D 73/00
U.S. Cl. 156—552 23 Claims



1. An apparatus for securing bags to an adhesive coated tape to form an imbricated, continuous chain of said bags, said bags being intermittently fed to said apparatus from a bag source on an individual basis where the forward end of each

bag, immediately prior to its being fed from said bag source, extends out of said source while the trailing end thereof is momentarily held in place by said source until the bag is fed therefrom, said apparatus comprising:

a. a frame,

b. an endless conveyor carried by said frame,

c. drive means responsive to said bag source for driving said conveyor means so that each bag released by the source is conveyed a first predetermined distance until the said trailing end thereof is disposed at a bag taping position at which time the conveyor means is momentarily stopped while the following bag is momentarily held at its trailing end in the bag source with its forward end extending onto said conveyor whereby said bags are conveyed to said bag taping position regardless of the length thereof since the bags are conveyed with respect to the said trailing ends thereof, and

d. a taping means mounted on said frame at said taping position in the path of movement of said bag, said taping means having at least one taping roll located beneath said taping position around which is fed an adhesive coated tape, said taping means further having at least one presser roll located above said taping position directly opposite said taping roll, said taping roll and said presser roll being operatively connected to said drive means for sequentially pressing said bags onto said tape with said presser rolls and incrementally rotating said taping roll to sequentially remove said bags a second predetermined distance from said conveyor after they have been pressed onto said tape when said endless conveyor is stopped so that said bags are sequentially pressed onto said tape to form said imbricated, continuous chain of bags regardless of the length of said bags since said trailing ends of said bags are conveyed to the bag taping position.

4,003,783

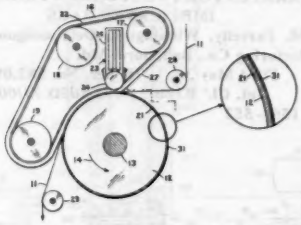
METHOD FOR COMPACTING A NONWOVEN FABRIC IMPREGNATED WITH A THERMOPLASTIC BINDER

Ernest J. Groome, Covington, Va., and Henry L. Hamrick, Hartsdale, N.Y., assignors to Clupak, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 394,993, Sept. 7, 1973, abandoned. This application Apr. 7, 1975, Ser. No. 565,823

Int. Cl.² D21H *5/24*

U.S. Cl. 162—168 R **2 Claims**



1. In a method of treating a preformed, non-woven fabric web having staple textile fibers randomly bonded together at contact points between said fibers by a thermoplastic binder having a predetermined softening temperature, including the steps of:

a. moisture conditioning said web;

b. continuously moving said conditioned web to the nip of a compactor means, the nip including a stretched surface of a moving elastic belt and a peripheral segment of a rotating, heated drum having a polished metal surface, the binder being normally adherent to the metal surface when heated in excess of its softening temperature;

c. compacting the web by the contraction of said elastic surface just beyond the nip while the web is confined between the belt and the drum periphery, whereby due to the frictional adherence between the web and the elastic surface, said web is caused to slip relatively to the drum periphery and to be contracted and compressed lengthwise thereby causing the fibers to be rearranged and locally flexed and crimped in upon themselves between the points of bonding with one another;

the improvement comprising:

d. coating the drum surface with a solid film of polytetrafluoroethylene resin prior to the compaction step; and

e. heating the surface of the drum in excess of the softening temperature of the binder during compaction, whereby the fabric web can be compacted while the temperature of the drum is in excess of the softening temperature of the binder without the binder and the web adhering to the drum surface, the web having improved handle and drape qualities imparted thereto by such treatment.

4,003,784

METHOD OF LUBRICATING RESILIENT BELT DURING WEB COMPACTION

Albert Heim, Oberageri, Switzerland, and Fausto Baroni, Verona, Italy, assignors to Clupak, Inc., New York, N.Y.

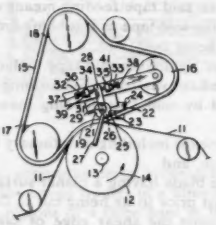
Division of Ser. No. 552,981, Feb. 26, 1975, Pat. No. 3,954,557. This application Oct. 16, 1975, Ser. No. 622,861

Claims priority, application Italy, July 22, 1974, 52262/74

The portion of the term of this patent subsequent to May 4, 1993, has been disclaimed.

Int. Cl.² D21H *5/24*

U.S. Cl. 162—199 **4 Claims**



1. A method for lubricating the inner surface of a moving endless resilient belt used in a web compacting apparatus, the belt approaching and travelling under compression beneath a smooth curved portion of a compactor bar extending across the width of the belt and contiguous to its inner surface and over a curved drum surface contiguous to the outer surface of the belt, the web compaction occurring at the belt outer surface as the belt outer surface changes in curvature in passing from the bar to the drum, commprising the steps of:

a. providing a liquid dam wall section closely adjacent to and coextensive with the curved portion of the compactor bar on the belt approach side thereof, and spaced from the inner surface of the belt;

b. providing at least one weir opening in said dam wall section for receiving overflow liquid lubricant;

c. continuously applying liquid lubricant to the inner surface of the belt on the belt approach side of the compactor bar sufficient to establish a pool of such liquid lubricant between the dam wall section and the inner surface of the belt on the belt approach side of the compactor bar, the upper level of the pool lying at the same level as the weir opening, whereby the depth of the pool is limited by overflow of excess liquid lubricant over the weir opening; and

d. confining the sides of the pool of liquid lubricant at the belt edges by suitable confining means.

4,003,785

REACTOR CORE MELT CONTAINMENT RECEPTACLE

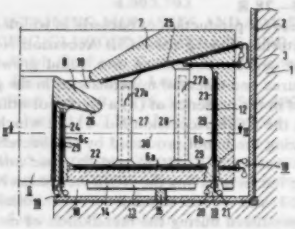
Peter Rau, Mittelehrenbach near 89, Germany, and Kevin Hunt, Macclesfield, England, assignors to Siemens Aktiengeselischaft, Munich, Germany

Filed Apr. 19, 1974, Ser. No. 462,433

Claims priority, application Germany, Apr. 19, 1973, 2320091

Int. Cl.² G21C 9/00

U.S. Cl. 176—38 8 Claims



1. A reactor core melt containment receptacle for use beneath a reactor core, said receptacle comprising a bottom wall, an outer annular wall and at least one inner wall surrounded by and laterally spaced from said outer annular wall, said outer and inner walls having tops and extending upwardly from said bottom wall and forming a lateral space between each other for containing a core melt at a level below said tops, a declining annular roof extending radially inwardly from the top of said outer wall and above said level having a bottom surface forming a first heat shield against upward heat radiation from said core melt, a declining roof extending towards said outer wall from said inner wall and above said level having a bottom surface forming a second heat shield against upward heat radiation from said core melt, said roofs having terminating edge portions forming a space therebetween above said level and through which a core melt can fall into said lateral space, said bottom and said outer and inner walls having surfaces heated by said core melt when contained in said lateral space, and means for cooling all of said surfaces.

4,003,786

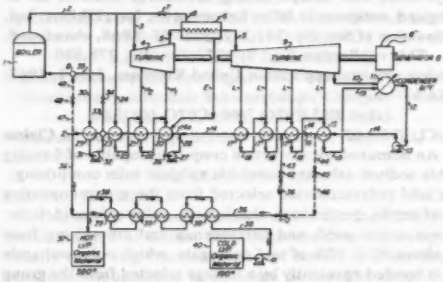
THERMAL ENERGY STORAGE AND UTILIZATION SYSTEM

Robert P. Cahn, Millburn, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Sept. 16, 1975, Ser. No. 613,754

Int. Cl.² G21C 15/16

U.S. Cl. 176—39 19 Claims



1. A process for efficiently utilizing the heat output of a constant output nuclear reactor or fossil fuel furnace and boiler in an electricity generating plant and enabling the plant to achieve flexible power output which comprises the steps of:

a. using extraction steam and primary high pressure steam to heat boiler feed water in heat exchanger means;

b. shunting a portion of the hot boiler feed water during periods of low power demand to oil-water heat exchanger means;

c. moving low vapor pressure organic heat retention material from cold storage means to hot storage means through the oil-water heat exchanger means of (b);

d. heating low vapor pressure organic heat retention material in the oil-water heat exchanger means by means of the hot boiler feed water of (b);

e. storing the hot low vapor pressure organic heat retention material at atmospheric pressure in isolation from the atmosphere in a hot storage location means;

f. during periods of peak power demand curtailing boiler feed water heating by extraction steam and primary high pressure steam in the heat exchanger means of (a);

g. reversing the flow of the shunted portion of boiler feed water so that cold boiler feed water passes through the oil-water heat exchanger means of (c);

h. moving hot low-vapor pressure organic heat retention material from hot storage location means to cold storage location means;

i. passing the moving hot low vapor pressure organic heat retention material through the oil-water heat exchanger means;

j. heating the cold boiler feed water passing through the oil-water heat exchanger means by means of the moving hot low vapor pressure organic thermal energy retention material moving from hot to cold storage location means;

k. passing the hot boiler feed water to the boiler.

4,003,787

DEVICE FOR SUPPORTING A FUEL-PIN CLUSTER WITHIN A NUCLEAR REACTOR FUEL ASSEMBLY WRAPPER

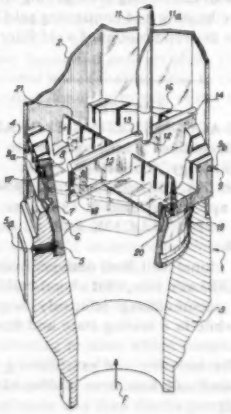
Pierre Marmonier; Bernard Mesnage; Jean Teulon, all of Aix-en-Provence, and Jean-Pierre Simonneau, Manosque, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Mar. 11, 1975, Ser. No. 557,319

Claims priority, application France, Mar. 28, 1974, 74.10906

Int. Cl.² G21C 3/30

U.S. Cl. 176—76 9 Claims



1. A device for supporting a cluster of fuel pins having lower end-caps within the wrapper of a nuclear reactor fuel assembly comprising a coaxial supporting member at the lower end of the vertically disposed fuel assembly wrapper, a series of parallel rails, grooves in said lower end-caps engaging on the

upper extremities of said rails, vertical parallel slots in said supporting member engaging lateral extremities of said rails, locking means securing said rails in said slots including open grooves in the sides of said supporting member extending along said vertical slots, and said locking means annularly engaging portions of said rails in said grooves and within said vertical slots.

4,003,788

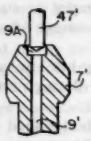
NUCLEAR FUEL ELEMENTS SEALED BY ELECTRIC WELDING

Eugene S. Boyko, Monroeville; Joseph Campbell, Pittsburgh, and Roger J. Wiggins, Allison Park, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 96,153, Dec. 8, 1970, Pat. No. 3,842,238. This application June 27, 1974, Ser. No. 483,601

Int. Cl.² G21C *3/10*

U.S. Cl. 176—79 **1 Claim**



1. A nuclear fuel unit which comprises a tubular container having a first end sealed and having a second end sealed except for a stepped opening extending from the interior to the exterior of the container and nuclear fuel disposed within the container, said stepped opening having a first portion with a first cross section adjacent the outer end of the opening and a second portion having a second cross section smaller than the first cross section which extends from the first portion towards the interior of the container, a gas under a pressure of a plurality of atmospheres located within the container, a welding filler metal located in the first portion of the opening and disposed in sealing engagement therewith, said welding filler metal having been formed by positioning a fusible welding electrode within the opening in a manner to make essentially line contact with a portion of the opening and the fusible electrode, directing sufficient current through said electrode, line contact and wall containing the opening to fuse the electrode by resistance heating and continuing said heating by arc discharge until the desired amount of weld filler material seals said opening.

4,003,789

TRIGLYCERIDE-ACCUMULATING CLONAL CELL LINE

Howard Green, Brookline, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Division of Ser. No. 438,042, Jan. 30, 1974, Pat. No. 3,884,758. This application Jan. 8, 1975, Ser. No. 539,378

Int. Cl.² C12K *9/00*

U.S. Cl. 195—1.8 **3 Claims**

1. An isolated clonal cell line derived from a culture of mouse fibroblast 3T3 cell line, said clonal cell line having the characteristic of accumulating relatively large amounts of triglyceride fats while in a resting state and a suitable growth media therefrom.

2. A method for isolating and establishing a triglyceride-accumulating clonal cell line from a fibroblast parent cell culture comprising:

a. separating a portion from said parent culture which is rich in triglyceride-accumulating cells;

b. transferring said portion to a culture medium;

c. growing a new culture from said transferred portion;

d. repeating steps (a) through (c) until a separate colony of triglyceride-accumulating clonal cells is established; and,

e. separating said colony in a pure state.

4,003,790

NITROGEN CONTROL IN MIXED CULTURE PRODUCTION

Lionel J. Barnes, Ashford; John H. Harwood, Stoke-on-Trent; David E. F. Harrison, and Harmannus J. Doddema, both of Faversham, all of England, assignors to Shell Oil Company, Houston, Tex.

Filed Aug. 11, 1975, Ser. No. 603,416

Claims priority, application United Kingdom, Aug. 12, 1974, 35435/74

Int. Cl.² C12B *1/00*

U.S. Cl. 195—28 R **4 Claims**

1. A process for production of bacteria in which a methane-utilizing bacterium having the NCIB Accession No. 11084 is grown under aerobic conditions in a liquid growth medium comprising urea and essential minerals salts in the presence of methane and in the presence of (a) a methanol-utilizing bacterium having the NCIB Accession No. 11112 which is capable of metabolizing methanol produced by the bacterium having the NCIB Accession No. 11084 and (b) four non-hydrocarbon-utilizing bacteria having the NCIB Accession Nos. 11062, 11061 11063 and 11065 capable of metabolizing organic substances produced during the metabolism of methane and/or methanol.

4,003,791

MATERIAL USEFUL FOR AND METHOD OF EMPLOYING THE SAME FOR THE GROWING OF MICROORGANISMS

Anthony Benny Rizzuto, Piscataway, N.J.; Richard David Skole, Elmhurst, N.Y.; Henry Harry Newman, Bronx, N.Y.; Jacqueline Noailles-Benito Hogu, Brooklyn, N.Y., and Vincent Anthony Toscano, Lawrenceville, N.J., assignors to Amstar Corporation, New York, N.Y.

Division of Ser. No. 485,730, July 3, 1974, abandoned. This application Sept. 29, 1975, Ser. No. 617,369

Int. Cl.² C12D *9/08*

U.S. Cl. 195—36 P **11 Claims**

1. A method for the production of penicillin which comprises growing a penicillin-producing mold in a culture medium in the presence of about 4–8% wt./vol. of a high-ash containing sucrose syrup as the carbohydrate, said sucrose syrup analyzing on a solids basis, about 40–85% by weight sucrose, about 8–30% by weight invert, about 3–25% by weight ash, the remaining percent being other organic components.

4,003,792

CONJUGATES OF ACID POLYSACCHARIDES AND COMPLEX ORGANIC SUBSTANCES

Patrick James Mill, Beaconfield; Michael Alan Cresswell, High Wycombe, and Joseph George Feinberg, London, all of England, assignors to Miles Laboratories, Inc., Elkhart, Ind.

Continuation of Ser. No. 741,212, June 28, 1968, abandoned. This application Aug. 8, 1972, Ser. No. 278,880

Claims priority, application United Kingdom, July 1, 1967, 31374/67

Int. Cl.² C07G *7/00*; C07C *103/52*

U.S. Cl. 195—63 **32 Claims**

1. An immunologically active conjugate capable of forming soluble sodium salts and insoluble calcium salts comprising:

an acid polysaccharide selected from the group consisting of pectin, pectic acid, alginic acid, celluronic acid, lichenin uronic acid, and carrageenan and comprising from about 93 to 98% of said conjugate, which polysaccharide is bonded covalently by a linkage selected from the group consisting of amide, ester, and a combination of amide and ester bonds to

an immunologically active proteinaceous component selected from the group consisting of ovalbumin, lactalbumin, insulin, trypsin, chymotrypsin, ficin, Timothy pollen extract, cocksfoot pollen extract, ragweed pollen extract,

birch pollen extract, horse dander extract, cat epithelium extract, haddock extract, dry rot extract, baker's yeast extract, tetanus toxoid, diptheria toxin, bee venom, and snake venom and comprising from about 2 to 7% of said conjugate.

4,003,793

MEDIA CONTAINING MOLASSES AND SOY FLOUR FOR PRODUCING GLUCOSE ISOMERASE AND METHOD

Kenneth K. Shieh, St. Louis County, Mo., assignor to Anheuser-Busch, Incorporated, St. Louis, Mo.

Filed Feb. 10, 1975, Ser. No. 548,432
Int. Cl.² C12D *13/10;* C12B *3/04*
U.S. Cl. 195—66 R 7 Claims

1. A method of making glucose isomerase comprising the steps of adding an inoculum of an organism belonging to the genus of *Actinoplanes* to a fermentor containing a medium composed of about 0.4% to about 7.0% particulate soy material selected from the group consisting of soy flour and soy meal as a growth nutrient, growing said inoculum for a period of time and at a temperature sufficient to produce a desired yield of glucose isomerase, and harvesting the glucose isomerase.

4,003,794

PROCESS FOR PRODUCING CHOLESTEROL OXIDASE

Mamoru Sugiura, Konan; Hiroshi Shimizu, Nagaokakyo; Masayasu Sugiyama, Kyoto; Takeo Kuratsu, Osaka, and Fumio Hirata, Suita, all of Japan, assignors to Ono Pharmaceutical Co., Ltd., Osaka, Japan

Filed Dec. 29, 1975, Ser. No. 645,048
Claims priority, application Japan, Dec. 27, 1974, 50-1603
Int. Cl.² C12D *13/10*
U.S. Cl. 195—66 R 2 Claims

1. A process for producing a cholesterol oxidase, which comprises cultivating Schizophyllum commune (IFO 4928) in a culture medium and extracting the cholesterol oxidase from the culture filtrate.

4,003,795

PROCESS FOR THE DETERMINATION OF AT LEAST ONE OF THE ISOENZYMES OF LACTATENDEHYDROGENASE

Walther Lamprecht, Iserhagen FB, Germany, assignor to Kommanditgesellschaft Schwarzhaupt, Cologne, Germany

Filed Sept. 12, 1975, Ser. No. 612,633
Claims priority, application Germany, Sept. 12, 1974, 2443741
Int. Cl.² G01N *31/14*
U.S. Cl. 195—103.5 R 6 Claims

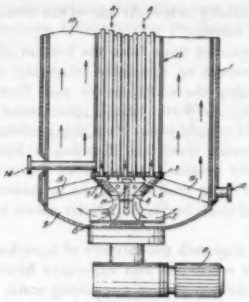
1. Process for the determination of at least one of the isoenzymes 4 and 5 of lactate dehydrogenase in a test sample by visually observing the conversion of lactate and nicotinamideadeadenine-dinucleotide to pyruvate as brought about by the isoenzymes 4 and 5 of lactate dehydrogenase in a test reagent carrier which has had applied thereon said lactate and nicotinamide-adenine-dinucleotide into contact with a test sample to be assayed for said isoenzymes, said test reagent having been buffered to provide for said conversion a buffer specific pH value of 6–6.5.

4,003,796

APPARATUS FOR MIXING A LIQUID PHASE WITH A GASEOUS PHASE

Hans Müller, Erlenbach, and Konstantin Sotirianos, Stafa, both of Switzerland, assignors to Dr. Ing. Hans Muller, Mannedorf, Switzerland

Filed May 15, 1975, Ser. No. 577,749
Claims priority, application Switzerland, May 28, 1974, 7247/74
Int. Cl.² C12B *1/14*
U.S. Cl. 195—142 10 Claims



1. In a fermentation device for mixing a fermentation liquor containing micro-organisms with a gaseous phase, a combination comprising a vessel having an interior adapted to contain liquor to be aerated with gaseous phase; a conically-shaped mixing chamber mounted in said vessel and having an inlet and an outlet which is in communication with said interior of said vessel; conveying means intermediate said vessel and said chamber for communicating the interior of said vessel with said inlet and adapted to cause liquor and gaseous phase contained in the vessel to flow along a path through said chamber; mixing and dispersing means including a rotary element mounted for turning movement in said chamber and a plurality of substantially radially-extending baffles mounted in said chamber intermediate said inlet and said outlet thereof so as to extend in direction generally transversely of the path, said rotary element being formed with a venturi-shaped passage composed of a throat portion downstream of said baffles which is in communication with said outlet, whereby centrifugally-created suction generated by said throat portion is adapted to draw liquor and gaseous phase through said chamber so as to become mixed therein prior to centrifugal ejection of the thus aerated liquor from said outlet into said vessel.

4,003,797

SUPERATMOSPHERIC PRESSURE SHALE RETORTING PROCESS

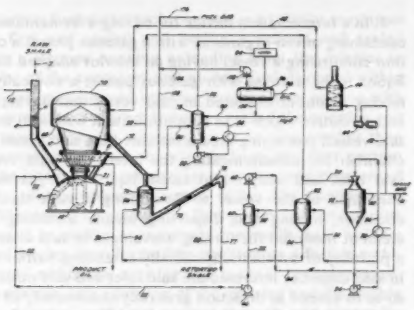
George D. Cheadle, Fullerton, and Roland O. Dhondt, Long Beach, both of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Filed May 5, 1976, Ser. No. 683,541
Int. Cl.² C10B *53/06*
U.S. Cl. 201—28 12 Claims

1. A shale retorting process which comprises:
1. gravitating crushed oil shale downwardly through a feed conduit into a feeder cylinder which alternately receives a charge of shale and then discharges the same upwardly by means of a reciprocating piston into the bottom of a communicating retort;
2. contacting the resulting upflowing shale in said retort with hot, downflowing eduction gases at superatmospheric pressures to educe product oil and gas from said upflowing shale, said oil and gas being discharged from the bottom portion of said retort into an isobaric product

collection vessel in which a first liquid level of crude product oil is maintained;

3. maintaining substantially continuous hydraulic communication between the product oil in said collection vessel and the bottom of said feed conduit, whereby a second liquid oil level is maintained in said feed conduit, said second oil level being substantially above said first oil level and forming a hydrostatic seal against retort pressure;
4. transferring hot, retorted shale overflowing the top of said retort through a gas-tight transfer conduit to a water quenching zone in which is maintained a first liquid water level substantially below the top of the retorted shale bed maintained therein;
5. removing retorted shale from the bottom of said quenching zone through an upwardly extending outlet conduit communicating therewith below said first water level, whereby a second water level is maintained in said outlet conduit, said second water level being substantially above said first water level and forming a hydrostatic seal against retort pressure, the rate of removal of said retorted shale being controlled so as to maintain the top of said retorted shale bed substantially above said first liquid water level;
6. recovering a quench gas mixture of superheated steam, a combustible water gas and vaporized heavier hydrocarbons from the top of said quenching zone; and
7. recycling to said feed conduit sufficient of a light product



oil recovered from said retorting to maintain said second oil level and to substantially prevent entry into said feed conduit of said crude product oil, said light product oil having a substantially lower pour point than said crude product oil.

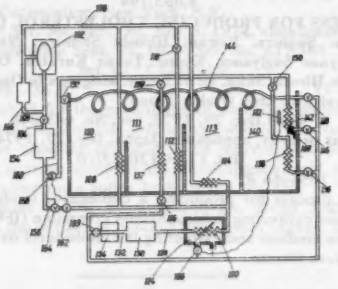
9. A shale retorting process which comprises:
1. gravitating crushed oil shale downwardly through a feed conduit into a feeder cylinder which alternately receives a charge of shale and then discharges the same upwardly by means of a reciprocating piston into the bottom of a communicating retort;
2. contacting the resulting upflowing shale in said retort with hot, downflowing eduction gases at superatmospheric pressures to educe product oil and gas from said upflowing shale, said oil and gas being discharged from the bottom portion of said retort into an isobaric product collection vessel in which a first liquid level of crude product oil is maintained;
3. maintaining substantially continuous hydraulic communication between the product oil in said collection vessel and the bottom of said feed conduit, whereby a second liquid oil level is maintained in said feed conduit, said second oil level being substantially above said first oil level and forming a hydrostatic seal against retort pressure;
4. transferring hot, retorted shale overflowing the top of said retort through a gas-tight transfer conduit to a water quenching zone in which is maintained a first liquid water level substantially below the top of the retorted shale bed maintained therein;
5. removing retorted shale from the bottom of said quenching zone through an upwardly extending outlet conduit communicating therewith below said first water level, whereby a second water level is maintained in said outlet conduit, said second water level being substantially above said first water level and forming a hydrostatic seal against retort pressure, the rate of removal of said spent shale being controlled so as to maintain the top of said retorted shale bed substantially above said first liquid water level;
6. recovering a quench gas mixture of superheated steam, water gas and vaporized heavier hydrocarbons from the top of said quenching zone;
7. cooling and partially condensing said quench gas mixture to recover heat and liquid water therefrom while controlling condensation temperature so as to recover an overhead off-gas containing sufficient steam to carry overhead at least about 90% of said hydrocarbons; and
8. further cooling and condensing said overhead off-gas to recover therefrom a relatively small volume of water and hydrocarbon condensate, and a combustible off-gas.

4,003,798

VAPOR GENERATING AND RECOVERING APPARATUS

James W. McCord, 9829 Timberwood Circle, Louisville, Ky. 40223

Filed June 13, 1975, Ser. No. 586,611
Int. Cl.² B01D 3/42
U.S. Cl. 202—160 18 Claims



1. A vapor generating and recovering apparatus for separating and recovering one component from a second component of a liquid solution comprising:

a housing including at least one chamber therein for vaporizing a first component from a liquid solution containing at least two components therein and recovering said vapor in the form of a liquid;

heat emitting means disposed in heat emitting relation with said chamber, said heat emitting means vaporizing said first component;

heat absorbing means disposed around the periphery of the housing at a preselected distance above said chamber, said heat absorbing means condensing the vaporized first component; and,

a variable heat system including said heat emitting means and said heat absorbing means, said system including a refrigerant compressor for compressing a refrigerant, said compressor being in fluid communication on its discharge side with said heat emitting means, said heat emitting means including coils therein whereby the compressed refrigerant is condensed upon heat exchange relation with the liquid in the chamber, said heat emitting means discharge being in series and in fluid communication with a by-pass system and said heat absorbing means, said

by-pass system and said heat absorbing means being in parallel, said by-pass system and said heat absorbing means being in fluid communication with the suction side of said compressor, said by-pass system including a pressure actuated valve actuated at a preselected pressure of refrigerant discharging from said heat absorbing means.

4,003,799

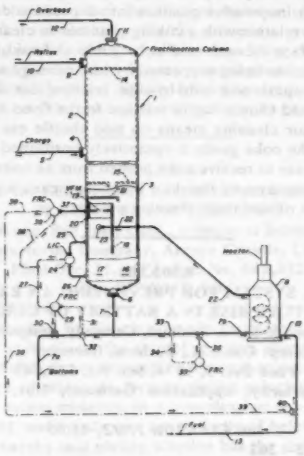
METHOD FOR CONTROLLING HEAT INPUT TO THE REBOILER SECTION OF A DISTILLATION COLUMN

R. Gene Fickel, Roselle, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 459,973, April 11, 1974, abandoned. This application June 12, 1975, Ser. No. 586,447

Int. Cl.² B01D *3/42*; C10G *7/00*

U.S. Cl. 203—2 4 Claims



1. A reboiler section, adapted to be disposed within a distillation column, which comprises, in combination:

a. a chordal baffle vertically disposed in said reboiler section, terminating at its upper extremity a finite distance below the lowermost tray, or deck of said column and at its lower end a finite distance above the bottom of said column, thereby forming a partially partitioned reboiler section having two chambers in open communication with each other at the bottom of said column;

b. a fluid outlet port in the bottom of said distillation column and a fluid inlet port in open communication with a first of said two chambers;

c. flow-measuring means, responsive to upwardly flowing vapors leaving said reboiler section, within said first chamber and disposed at the upper extremity thereof;

d. signal-sensing means, in open communication with said flow-measuring means, for transmitting a signal representative of the rate of vapor flow through said flow-measuring means, without the confines of said reboiler section; and,

e. an imperforate baffle, horizontally disposed between said lowermost tray and said flow-measuring means, said imperforate baffle extending entirely across said first chamber into the second of said two chambers and terminating a distance less than the internal diameter of said distillation column.

4,003,800

STYRENE PURIFICATION PROCESS

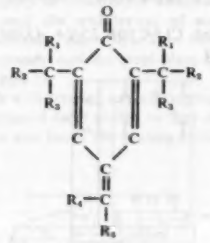
John D. Bacha, and Charles M. Selwitz, both of Monroeville, Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Jan. 2, 1976, Ser. No. 646,403

Int. Cl.² C07C *7/04*

U.S. Cl. 203—9 3 Claims

1. In a method for inhibiting the polymerization of styrene monomers during the vacuum distillation processing thereof, the improvement which comprises a continuous mass process for preparing styrene, adding during said vacuum distillation processing a polymerizing inhibiting amount of a quinone alkide, said quinone alkide having the formula:



wherein R_1, R_2 and R_3 are either alike or different, members selected from the group consisting of hydrogen, straight or branched chain alkyl moieties having from 1 to 8 carbon atoms, phenyl and alkyl substituted phenyl moieties having up to 9 carbon atoms, cyclic hydrocarbon moieties having from 3 to 5 carbon atoms, and wherein R_4 and R_5 are either alike or different, members selected from the group consisting of hydrogen, straight or branched chain alkyl moieties having from 1 to 18 carbon atoms, phenyl and alkyl substituted phenyl moieties having up to 9 carbon atoms, and cyclic hydrocarbon moieties having from 3 to 5 carbon atoms.

4,003,801

TREATMENT OF WATER VAPOR GENERATED IN CONCENTRATING AN AQUEOUS UREA SOLUTION

Sadashi Chikaoka; Toyotaro Kawabe; Hisashi Miyakawa, and Naotoshi Seki, all of Takaishi, Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed May 14, 1975, Ser. No. 577,341

Claims priority, application Japan, May 14, 1974, 49-52891

Int. Cl.² C07C *126/02*

U.S. Cl. 203—42 17 Claims

1. In the process for treatment of water vapor generated in concentrating an aqueous urea solution obtained by reacting carbon dioxide and ammonia at urea synthesis temperatures and pressures, wherein the resulting reaction mixture is passed through a plurality of unreacted ammonium carbamate decomposition stages, the pressures of which are stepwise reduced, to decompose and separate the unreacted ammonium carbamate from the aqueous urea solution, the aqueous urea solution containing small amounts of ammonia and carbon dioxide is subjected to concentration to separate therefrom water vapor containing a mist of the aqueous urea solution, ammonia and carbon dioxide, and the water vapor is treated to recover urea and ammonia values, the improvement which comprises:

1. separating from the water vapor the mist of the aqueous urea solution together with a part of the ammonia, carbon dioxide and water vapor to form a first condensate containing urea, ammonia and carbon dioxide,

2. condensing by indirect cooling the water vapor discharged from step (1) and containing the remaining part of the ammonia and carbon dioxide to form a second condensate containing ammonia and carbon dioxide,

3. subjecting the second condensate to rectification in a rectification zone to separate a mixed gas of ammonia and carbon dioxide containing a small amount of moisture, from water substantially free of ammonia and carbon dioxide, and
4. recovering the mixed gas from step (3).

4,003,802

COKE GUIDE MACHINE FOR A BATTERY OF COKE OVENS

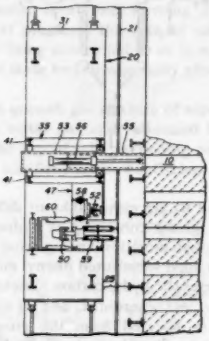
Erich E. Pries, Bochum, Germany, assignor to Dr. C. Otto & Comp. G.m.b.H., Bochum, Germany

Filed Feb. 3, 1975, Ser. No. 546,619

Claims priority, application Germany, Oct. 9, 1974, 2448043

Int. Cl.² C10B *25/14, 43/04*

U.S. Cl. 202—241 **7 Claims**



1. In a battery of coke ovens wherein horizontally spaced-apart coking chambers have sealing surfaces at door frames defining coke discharge openings which are normally closed by individually removable doors, and wherein a longitudinal coke bench extends along the battery of coke ovens in a direction which is generally normal to the axes of the coke oven chambers and below the coke discharge openings thereof, a coke guide apparatus movable along said coke bench comprising, in combination:

a shuttle car adapted for positioning into desired stationary locations relative to the spaced-apart coking chambers by movements along said coke bench while spaced outwardly from the coke ovens in a manner to define an open passageway between the coke ovens and the shuttle car,

carriage means supported in a suspended manner by said shuttle car for movement along the shuttle car in a generally parallel direction to the movement by the shuttle car along said coke bench,

a coke guide including an extendible guide member supported by said carriage means for bridging said open passageway to conduct coke pushed from an oven chamber above said coke bench,

door handling means carried by said carriage means for movement therewith along said shuttle car in the same general direction which the shuttle car moves along the coke bench,

means adapted to clean the sealing surface of a coking chamber while said means is carried by said carriage means and movable therewith along the shuttle car in the same general direction which the shuttle car moves along the coke bench,

first transport means operative to bridge said open passageway while extending between said carriage means and said means adapted to clean the sealing surface by displacing the latter in a generally parallel direction with said axes of the coke oven chambers from an inoperative position lying generally within the bounds of said shuttle car into an operative location at a coking chamber for cleaning the sealing surface thereof,

second transport means operative to bridge said open passageway while extending between said carriage means and said door handling means by displacing the latter in a generally parallel direction with said axes of the coke oven chambers from an inoperative position lying generally within the bounds of said shuttle car into a door transferring position at a door frame of a coking chamber,

door cleaning means mounted in a fixed manner upon said shuttle car for cleaning said removable doors, and

spaced-apart suspension members supported by said carriage means for side-by-side support of said first and second transport means, said suspension members supporting said door handling means and said means adapted to clean the sealing surface, said suspension members being adapted to pivot about a common vertical axis through an angle of 180° relative to said shuttle car to pivotally displace said door handling means from a position defining an aligned relation with a coke oven chamber for movement into a door transferring position therewith into a position where movement of only said carriage means defines an aligned relation with said door cleaning means, said means adapted to clean the sealing surface being pivotally displaced by the suspension members from an inoperative position into a position defining an aligned relation with a coking chamber to clean the sealing surface thereof, said coke guide and said door handling means being supported by said carriage means in a spaced-apart and side-by-side relation for movement along said shuttle car in relation to the fixed location of said door cleaning means on said shuttle car such that when the coke guide is operatively positioned along the shuttle car to receive coke pushed from an oven chamber then concurrently the door handling means is positioned in front of said door cleaning means.

4,003,803

CONTROL SYSTEM FOR PREVENTING AN EXCESSIVE TEMPERATURE RISE IN A BATTERY OF COKE OVENS

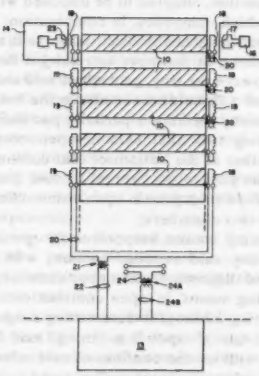
Helmut Schmidt-Balve, Bochum, Germany, assignor to Dr. C. Otto & Comp. G.m.b.H., Bochum, Germany

Filed Dec. 3, 1974, Ser. No. 529,043

Claims priority, application Germany, Nov. 30, 1973, 2359745

Int. Cl.² C10B *21/12, 41/00*

U.S. Cl. 202—262 **7 Claims**



1. A control system for preventing the development of an excessive temperature within heating flues for individual coke oven chambers in a battery of coke ovens, said control system including:

valve means for controlling the flow of combustion gas into

the heating flues located at the sides of a given coke oven chamber,

means responsive to the charging of coal into the given coke oven chamber for producing a first electrical signal,

means responsive to the pushing of coke from the given coke oven chamber for producing a second electrical signal,

means responsive to the amount of heat fed into the given coke oven chamber for producing a third electrical signal,

means responsive to the amount of heat yielded from flues at the sides of the given coke oven chamber for producing a fourth electrical signal,

means for producing a fifth electrical signal which varies in response to a comparison of the actual temperature rise in heating flues for the coke oven chamber with a predetermined acceptable temperature in the heating flues during a desired coking period and determined in relation to the properties of the refractory material forming the heating flu .s, and

controller means including a timer circuit to clock a predetermined coking period for a coal charge in the given coke oven chamber, said timer circuit being responsive to said first and second electrical signals to control said valve means in a manner to block the flow of combustion gas into the heating flues at the sides of the given coke oven chamber when the clocked duration of the coking time for a coal charge therein exceeds a predetermined coking period, said controller means being responsive to a signal produced by means receiving said third, fourth and fifth electrical signals for computing a maximum duration to the coking period by the coke oven chamber.

4,003,804

METHOD OF ELECTROPLATING OF ALUMINUM AND PLATING BATHS THEREFOR

Jack Yea Wong, San Jose, Calif., assignor to Scientific Mining & Manufacturing Company, Arroyo Grande, Calif.

Filed Dec. 31, 1975, Ser. No. 645,552
Int. Cl.² C25D *3/44*
U.S. Cl. 204—14 N **31 Claims**

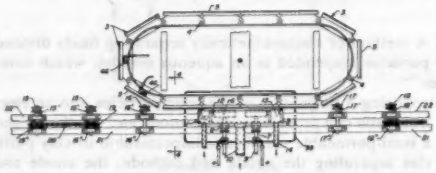
1. In a method for forming an electroplating solution for aluminum or its alloys, the step of reacting aluminum with a hydrogen halide in an aromatic hydrocarbon solvent and in the absence of water, to form a plating solution having an aluminum cation molarity, in a complex ion form, of below about 4.2 M, and a hydrogen ion molarity of below about 0.5 molarity whereby said plating solution has the ability to plate aluminum onto a cathode substrate at low voltages, on the order of below 3 volts, in the absence of an aluminum anode.

4,003,805

SYSTEM FOR ELECTROPLATING A SEQUENCE OF MOVING PLATE MEMBERS

Glenn R. Schaer, and Harold E. Trumbull, both of Columbus, Ohio, assignors to UOP Inc., Des Plaines, Ill.

Filed Oct. 20, 1975, Ser. No. 624,209
Int. Cl.² C25D *5/02*, *5/26*
U.S. Cl. 204—27 **10 Claims**



1. A continuous automatic method for effecting the plating of a thin copper coating onto a steel plate, which comprises the steps of:

a. conveying a cleaned steel plate in a generally vertical position to a plating station and transferring such plate to movable generally vertical cathode-conveyor means providing a current conducting face for supplying electrical current uniformly to the back side of said plate as it passes the plating station,

b. supplying a copper containing electrolyte solution into contact with a vertical strip portion of said steel plate from a containment zone with an open portion maintained against the face of the moving plate to be coated while simultaneously supplying electric current to said cathode-conveyor means and to an anode means positioned to be maintained closely adjacent substantially the full height of a strip of the front face of the steel plate from within said electrolyte containment zone,

c. with said supply of electrolyte solution to said containment zone and the withdrawal of solution therefrom providing turbulent electrolyte flow between the spaced faces of the anode and the steel plate during the plating operations, and

d. continuously withdrawing and conveying away the resulting copper coated steel plates as they are passed by the anode means and leave the plating station.

4,003,806

SILVER PLATING BATH

Robert William Etter, Lancaster County, Pa., assignor to RCA Corporation, New York, N.Y.

Filed May 30, 1975, Ser. No. 582,856
Int. Cl.² C25D *3/46*
U.S. Cl. 204—46 R **6 Claims**

1. An improved acidic, aqueous silver-electroplating solution containing silver iodide and potassium iodide, wherein the improvement comprises the addition of from about 0.12 mols/liter to about 0.20 mols/liter of a calcium salt to said solution.

4,003,807

ELECTROCHEMICAL FLUORINATION OF KETONES WITHIN THE PORES OF AN ANODE

William V. Childs, and Forrest N. Ruehlen, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed June 2, 1975, Ser. No. 583,315
Int. Cl.² C25B *3/08*
U.S. Cl. 204—59 F **10 Claims**

1. A process for the electrochemical fluorination of a ketone having the formula

$$(C_nHX_{2n})\,\overset{O}{\overset{\|}{C}}\,(C_mX_{2m+1})$$

wherein X is hydrogen or fluorine, wherein m and n are integers having the value of 1, 2 or 3 and wherein the sum of $m+n$ is 2, 3 or 4 comprising:

passing an electric current through a current-conducting essentially anhydrous liquid hydrogen fluoride electrolyte contained in an electrolysis cell provided with a cathode and a porous carbon anode;

contacting said ketone with said electrolyte within pores of said anode to thus at least partially fluorinate at least a portion of said ketone; and

recovering perfluorinated product from said anode.

4,003,808

METHOD AND APPARATUS FOR REGULATING AND CONTROLLING THE ANODE CURRENT AND FOR AVOIDING SHORT-CIRCUITS BETWEEN THE ELECTRODES OF AN ELECTROLYSIS CELL

Karl-Heinz Sieberer, Zirndorf near Nurnberg, Germany, assignor to Firm C. Conradty, Nurnberg, Germany

Filed Apr. 30, 1975, Ser. No. 573,367

Claims priority, application Germany, Nov. 14, 1974, 2454014

Int. Cl.² C25B *1/36, 15/02*

U.S. Cl. 204—99 **8 Claims**

1. Apparatus for regulating and controlling the anode current and for avoiding short circuits between the anode means and cathode of an electrolysis cell, said anode means being positionable with respect to the cathode to control the current in an anode means current path, said apparatus comprising:

sensing means located along the current path for the anode means and within the magnetic field produced by the current, said sensor comprising semi-conductor means, the resistance of which is responsive to the strength of the magnetic field and thereby proportional to the magnitude of the anode current;

means coupled to said sensing means for ascertaining the deviation of the resistance of said sensing means from a preselected value corresponding to a desired anode current value; and

indicator means for indicating a deviation of said sensing means resistance and said anode current from said preselected value.

4,003,809

ISOTOPE SEPARATION PROCESS

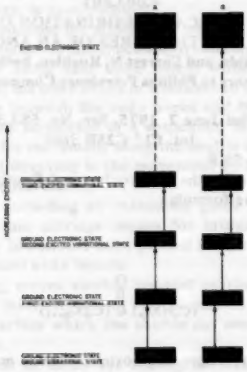
Richard K. Lyon, Fanwood, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 408,669, Oct. 23, 1973, Pat. No. 3,937,956. This application Apr. 23, 1975, Ser. No. 570,849

The portion of the term of this patent subsequent to Feb. 10, 1993, has been disclaimed.

Int. Cl.² B01J *1/10*

U.S. Cl. 204—157.1 R **15 Claims**



1. A method of separating the isotopes of an element, said method being applied to a gaseous compound of said element, and said method comprising subjecting molecules of said compound to radiation from an IR laser at or about a predetermined frequency at a power density of at least 10^4 watts per cm^2 per torr pressure of the gaseous compound for a time between 10^{-10} and 5×10^{-5} seconds, in the presence of a second gas, said second gas partial pressure being at least 5 times the partial pressure of said gaseous compound, whereby the molecules containing the isotope or isotopes are preferentially excited and sequentially absorb more than 1 quanta of IR radiation, preferentially converting the excited molecules by any means whose rate or selectivity is sensitive to temperature and separating said converted molecules from the molecules which are either unconverted or have been converted to some chemically different product.

4,003,810

PREVENTING DISCOLORATION IN HYDROLYZED ETHYLENE-VINYL ACETATE COPOLYMERS

John M. Hoyt; Karl Koch, and Mathew Williams, Jr., all of Cincinnati, Ohio, assignors to National Distillers and Chemical Corporation, New York, N.Y.

Continuation of Ser. No. 516,247, Oct. 18, 1974, abandoned, which is a division of Ser. No. 377,997, July 10, 1973, Pat. No. 3,882,005. This application May 6, 1976, Ser. No. 683,991

Int. Cl.² C08F *8/12*

U.S. Cl. 204—159.14 **2 Claims**

1. A hydrolyzed ethylene-vinyl acetate copolymer having a residual vinyl acetate content of 0.1 to 15 weight percent, said hydrolyzed ethylene-vinyl acetate copolymer having a yellowness index (ASTM D-1925-63T) of a specimen thickness of 0.25 inch and having been prepared by

alcoholyzing an ethylene-vinyl acetate copolymer containing 8–40 weight percent vinyl acetate and having a melt index in the range of from 1 to 25 in suspension in a substantially anhydrous alcoholyzing medium containing a lower alkanol having from 1 to 4 carbon atoms and an alkali metal alkoxide or hydroxide catalyst, and

subjecting the alcoholyzing reaction medium containing the copolymer to electromagnetic radiation of wave lengths in the range of about 3,000 to 8,000 Angstrom units during at least a portion of the alcoholysis reaction.

4,003,811

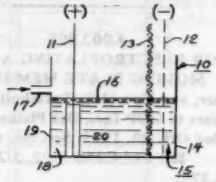
ELECTROKINETIC SEPARATION OF SOLID PARTICLES FROM AQUEOUS SUSPENSIONS THEREOF

Albert C. Kunkle, Macon, Ga., assignor to J. M. Huber Corporation, Borger, Tex.

Continuation of Ser. No. 436,408, Jan. 25, 1974, abandoned, and a continuation-in-part of Ser. No. 403,191, Sept. 26, 1973, abandoned, and a continuation-in-part of Ser. No. 263,376, June 5, 1972, abandoned. This application Dec. 13, 1974, Ser. No. 532,657

Int. Cl.² B01D *13/02*

U.S. Cl. 204—180 R **9 Claims**



1. A method of electrokinetically separating finely divided clay particles suspended in an aqueous medium which comprises

introducing a suspension of the solid particles into an electrokinetic cell provided with an anode and a cathode, and a semi-permeable membrane impermeable to clay particles separating the anode and cathode, the anode and membrane forming an anodic compartment in the cell, the cathode and membrane forming a cathodic compartment in the cell;

directing the particle suspension into the anode compartment;

circulating an electrolyte solution having a pH range from about 2 to about 7 through the cathode compartment;

applying a direct current field between the anode and cathode to cause the solid particles to be deposited from the suspension by electrophoretic action onto the anode concomitantly with the aqueous portion of the suspension being caused to migrate electroosmotically through the semi-permeable membrane and into the cathode compartment; and

removing the solid particles from the anode and the water from the cathode compartment.

4,003,812

COLLOIDAL POLYSULFONE ELECTRODEPOSITION COMPOSITIONS

Luciano C. Scala, Murrysville, and David C. Phillips, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 15, 1975, Ser. No. 568,227

Int. Cl.² C08K *3/18, 3/28;* **C25D** *13/06, 13/10*

U.S. Cl. 204—181 **9 Claims**

1. A method of making a conducting, non-aqueous, colloidal polysulfone electrodeposition composition, comprising the steps of:

a. combining 1 part by weight of a polysulfone comprising aromatic groups selected from the group consisting of phenylene and diphenylene and mixtures thereof joined together by linkages selected from the group consisting of sulfone, ether and isopropylidene and mixtures thereof, said polysulfone characterized as having at least sulfone linkages, 20–37 parts by weight of a non-aqueous, organic, aprotic solvent for the polysulfone and 0.8–1.2 parts by weight of a secondary or tertiary amine, to form a polysulfone solution, followed by

b. adding this polysulfone solution to 25–150 parts by weight of a non-aqueous, organic, non-electrolizable, liquid, non-solvent for the polysulfone, which is miscible with the aprotic solvent, to provide an electrodeposition composition having a colloidal dispersion within the solvent mixture, said composition having a pH of between about 7–11.

4,003,813

METHOD OF MAKING A MAGNETIC OXIDE FILM WITH HIGH COERCIVE FORCE

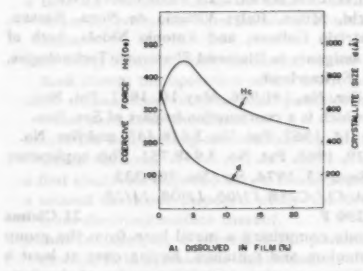
Seizi Hattori, Asahi; Nobuo Inagaki, Katsuta, and Yoshikazu Ishii, Mito, all of Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Filed Aug. 14, 1975, Ser. No. 604,774

Claims priority, application Japan, Aug. 26, 1974, 49-97647

Int. Cl.² C23C *15/00;* **B05D** *5/12;* **G11B** *23/00*

U.S. Cl. 204—192 **7 Claims**



1. A method of making a high coercive force magnetic oxide film comprising the steps of sputtering a target made of iron and aluminum in an atmosphere containing an inert gas and oxygen with the oxygen above a certain partial pressure to form on a substrate an α-Fe_2O_3 non magnetic oxide film having aluminum dissolved therein, and reducing said non-magnetic oxide film under a hydrogen gas atmosphere to yield an Fe_3O_4 magnetic oxide film having aluminum dissolved therein.

4,003,814

APPARATUS FOR THE CONTINUOUS MEASUREMENT OF THE OXYGEN CONTENT OF MOLTEN COPPER OR ALLOYS THEREOF

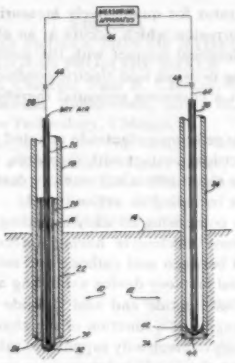
Peter Tarassoff, Dollard des Ormeaux; Tadeusz R. Kowalski, Ville d'Anjou, and Meguru Nagamori, Ste. Foy, all of Canada, assignors to Noranda Mines Limited, Toronto, Canada

Filed July 21, 1975, Ser. No. 597,760

Claims priority, application Canada, Aug. 2, 1974, 206219

Int. Cl.² G01N *27/46*

U.S. Cl. 204—195 S **12 Claims**



1. An apparatus for the continuous measurement of the oxygen content of copper and copper alloys comprising:

a. an austenitic stainless steel tube possessing a large heat capacity and capable of withstanding the operative conditions of the molten copper or alloy thereof;

b. a closed end tube of solid electrolyte inserted inside the stainless steel tube and projecting therefrom a distance at least equal to the diameter of the solid electrolyte tube;

c. a fine grained alumina cement inserted between the stainless steel tube and the solid electrolyte tube for cementing the stainless steel tube to the solid electrolyte tube;

d. means on the inside of stainless steel tube for promoting adhesion of the alumina cement to the stainless steel tube;

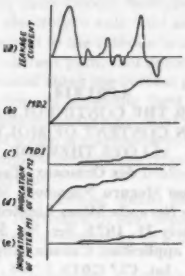
e. means for providing a first electrical connection with the inside of the solid electrolyte tube at the bottom thereof wherein a predetermined reference oxygen potential is maintained; and

f. a melt contact immersed in the molten copper or copper alloy for providing a second electrical connection with the outside of the solid electrolyte as an indication of the oxygen content of the molten copper or copper alloy.

4,003,815
APPARATUS FOR MEASURING STRAY CURRENT ELECTROLYTIC CORROSION

Hironosuke Ikeda, Hirakata; Makoto Yamada, Katano, and Hiroshi Kutsuyama, Hirakata, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Continuation of Ser. No. 448,285, March 5, 1974, abandoned. This application May 9, 1975, Ser. No. 575,998
Int. Cl.² G01N 27/46, 27/42
U.S. Cl. 204—195 C 14 Claims



1. An apparatus for qualitatively measuring an amount of electrolytic corrosion which occurs in an electric conductor installed in electrical contact with the earth due to leakage current flowing between said electric conductor and the earth resulting from a corrosion potential therebetween, comprising:

an earthable reference electrode adapted to be disposed in good electrical contact with the earth,

a solid state electrochemical memory device comprising:

a cathode including an active metal,

an anode comprising an alloy including said metal, and

a solid state electrolyte having ion conductivity sandwiched between said cathode and said anode,

said potential memory device exhibiting a terminal voltage between said anode and said cathode substantially linearly changing as a function of the charging or discharging quantity of electricity supplied to said device in accordance with the anode being positive or negative, respectively,

means for connecting said potential memory device to said electric conductor and to said earthable reference electrode for receiving therefrom a current flow which is produced as a result of the corrosion potential therebetween causing said leakage current, and which may vary in direction of flow corresponding to the polarity of said corrison potential, and for conveying said current flow to said potential memory device so as to effect a linear change of said terminal voltage, and,

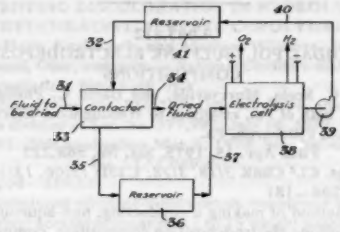
output means connected to said potential memory device for providing a qualitative indication of the amount of electrolytic corrosion occurring in said electric conductor in terms of the terminal voltage of said potential memory device,

said apparatus further including a selecting means, disposed between said connecting means and said device, for automatically selecting that current flow having a direction corresponding to a preselected polarity of said corrosion potential, whereby to cause said output means to provide said qualitative indication of the amount of electrolytic corrosion due to leakage current flowing in said direction corresponding to said preselected polarity.

4,003,816
SULFURLESS ELECTROLYTIC CONCENTRATION OF AQUEOUS SULFURIC ACID SOLUTIONS

E. Colin W. Clarke; Jeffrey F. Gilbert, and David N. Glew, all of Sarnia, Canada, assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 517,345, Oct. 23, 1974, Pat. No. 3,915,821. This application June 3, 1975, Ser. No. 583,375
Int. Cl.² C25B 1/02, 1/04
U.S. Cl. 204—237 2 Claims



1. An apparatus for reducing the H_2O content of a wet fluid comprising:

a. means for contacting the wet fluid with a stream of sulfuric acid solution and thereafter to separate the wet sulfuric acid solution from the fluid,

b. an electrolytic cell for subjecting the wet sulfuric acid solution to electrolysis to remove at least a substantial portion of the H_2O removed from the wet fluid and containing, in contact with the cathode which is exposed to the wet sulfuric acid, a quantity of a chlorine containing oxidizing agent sufficient to control the build-up of sulfur deposits on said cathode during the electrolysis of said wet sulfuric acid, said electrolytic cell being equipped with platinum electrodes,

c. a first liquid conduit means in communication with said contacting means and said electrolytic cell,

d. a second liquid conduit means in communication with said electrolytic cell and said contacting means,

e. a quantity of sulfuric acid solution contained in said elements (a), (b), (c) and (d) that is sufficient to remove at least a substantial portion of the H_2O content of the fluid, said sulfuric acid having a concentration greater than about 50 per cent by weight H_2SO_4, and

f. means for urging said sulfuric acid solution to circulate in a closed loop through said contacting means, said electrolytic cell, said first liquid conduit means, and said second liquid conduit means.

4,003,817
VALVE METAL ELECTRODE WITH VALVE METAL OXIDE SEMI-CONDUCTIVE COATING HAVING A CHLORINE DISCHARGE IN SAID COATING

Giuseppe Bianchi, Milan, Italy; Vittorio de Nora, Nassau, Bahamas; Patrizio Gallone, and Antonio Nidola, both of Milan, Italy, assignors to Diamond Shamrock Technologies, S.A., Geneva, Switzerland

Division of Ser. No. 141,946, May 10, 1971, Pat. No. 3,846,273, which is a continuation-in-part of Ser. Nos. 690,407, Dec. 14, 1967, Pat. No. 3,616,445, and Ser. No. 771,665, Oct. 29, 1968, Pat. No. 3,948,751. This application Sept. 23, 1974, Ser. No. 508,232
Int. Cl.² C25B 11/06, 11/08, 11/10
U.S. Cl. 204—290 F 21 Claims

1. An electrode comprising a metal base from the group consisting of titanium and tantalum, having over at least a portion of the base a coating containing oxides of rhenium, together with oxides from the group consisting of iron, manganese, zinc and tin and mixtures of oxides from the group consisting of iron, manganese, zinc and tin.

4,003,818

METHOD OF OBTAINING A MICRO-POROUS MEMBRANE AND NOVEL PRODUCT THUS OBTAINED

Michel Juillard, Orsay, and Pierre Bouy, Enghein-les-Bains, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed July 31, 1975, Ser. No. 600,219
Claims priority, application France, Feb. 8, 1974, 74.26922
Int. Cl.² B29D *27/08*; C25B *13/08*
U.S. Cl. 204—296 10 Claims

1. A method of producing a micro-porous membrane, characterized in that a homogeneous paste is first formed from a pore-forming particulate filler material and a latex of a fluorinated polymeric resin, said paste is dried in order to obtain a material containing between about 0.1 and 1% of water and the resulting material is reduced to powder form, the product so obtained is preformed and a membrane is formed by rolling said preform, the membrane thus obtained is sintered and the pore-forming particulate filler material removed.

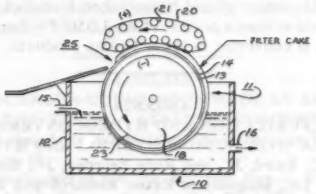
10. A micro-porous membrane for use in electrolysis made by the process of claim 1.

4,003,819

FILTRATION OF SOLIDS SUSPENSION ENHANCED BY APPLIED DC POTENTIAL

Albert C. Kunkle, and William Floyd Abercrombie, Jr., both of Macon, Ga., assignors to J. M. Huber Corporation, Borger, Tex.

Continuation of Ser. No. 436,413, Jan. 25, 1974, abandoned, and a continuation-in-part of Ser. No. 401,086, Sept. 26, 1973, abandoned, which is a continuation of Ser. No. 263,380, June 5, 1972, abandoned. This application Dec. 13, 1974, Ser. No. 532,662
Int. Cl.² B01D *13/02*
U.S. Cl. 204—301 10 Claims



1. A filter apparatus for solid liquid separation which comprises

a tank for the material to be filtered, a hollow cylindrical drum supported for rotation about a horizontal axis in the tank,

said drum being partially immersed in the material in the tank during the operation of the filter,

filter means impervious to solid particles mounted on the outer surface of the drum,

means for maintaining the interior region within the drum under vacuum,

a first electrode disposed above the filter means,

a second electrode disposed within the drum and spaced from the inner surface thereof,

means for applying a source of DC potential to create an electric field across said electrodes,

means for rotating said drum,

means for removing the filter cake deposited on the filter means, and

means for withdrawing filtrate from the drum interior.

4,003,820

SHORT RESIDENCE TIME HYDROPYROLYSIS OF CARBONACEOUS MATERIAL

Arnold H. Pelofsky, East Brunswick, and Marvin Greene, Somerset, both of N.J., assignors to Cities Service Company, Tulsa, Okla.

Filed Oct. 7, 1975, Ser. No. 620,468
Int. Cl.² C10G *1/02*
U.S. Cl. 208—8 11 Claims

1. A process for treating carbonaceous material with hydrogen, in the absence of added catalyst, comprising, in serial combination,

a. adding liquid or crushed solid carbonaceous material into a first reaction zone of a reactor having at least two reaction zones;

b. adding hot hydrogen to the stream of carbonaceous material to effect a reaction with same at a carbonaceous material heating rate of between about 500° C/second and about 100,000° C/second, a temperature of between about 400° and 2000° C and a pressure of between 500 and 5000 psig;

c. quenching the mixture of step b) while insuring that the total residence time of steps b) and c) varies from about 2 milliseconds to about 2 seconds;

d. removing at least a portion of the reaction products from said quenched mixture of step c); and

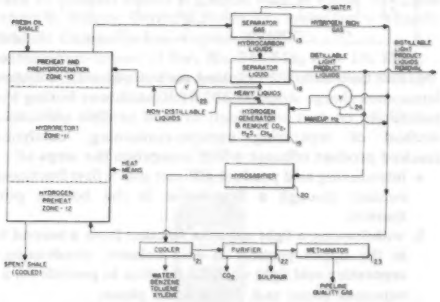
e. intoducing the residual carbonaceous material into a subsequent reaction zone and repeating steps (a) - (d) for said subsequent reaction zone.

4,003,821

PROCESS FOR PRODUCTION OF HYDROCARBON LIQUID FROM OIL SHALE

Sanford A. Weil, Chicago; Paul B. Tarman, Elmhurst, and Dharamvir Punwani, Bolingbrook, all of Ill., assignors to Institute of Gas Technology, Chicago, Ill.

Continuation-in-part of Ser. No. 409,915, Oct. 26, 1973, abandoned, and a continuation-in-part of Ser. No. 339,547, March 9, 1973, Pat. No. 3,891,403. This application Aug. 18, 1975, Ser. No. 605,411
Int. Cl.² C10G *1/02*
U.S. Cl. 208—11 R 12 Claims



1. A process for the production of predominately distillable aliphatic and alicyclic hydrocarbon liquids from kerogen containing oil shale wherein above about 77 percent of the organic carbon in said oil shale is converted to liquids and gases and there is minimal carbon residue formation resultipg from the conversion of kerogen to the hydrocarbon liquids comprising the steps:

introducing fresh oil shale into a preheat and prehydrogenation zone;

gradually preheating oil shale in the preheat and prehydrogenation zone at a rate to provide at least ten minutes to heat the oil shale from a temperature of 600° F. to a temperature of about 700° to about 950° F. in the pres-

ence of hydrogen-rich gas which inhibits the formation of carbonaceous residue;

hydroretorting the preheated and prehydrogenated oil shale in a hydroretort zone at a temperature of about 850° to about 1250° F. in the presence of hydrogen-rich gas containing stoichiometric required amounts and greater of hydrogen to form predominately distillable aliphatic and alicyclic hydrocarbon liquids from the preheated and prehydrogenated organic portion of said oil shale, said hydrogen-rich gas passing sequentially through said hydroretort and preheat and prehydrogenation zones in a single stream countercurrent to said shale and maintaining the hydrogen partial pressure in the preheat and prehydrogenation zone and in the hydroretort zone at a pressure of more than 35 psia;

removing the hydrogen-rich gas and distillable aliphatic and alicyclic liquids from the preheat and prehydrogenation zone and

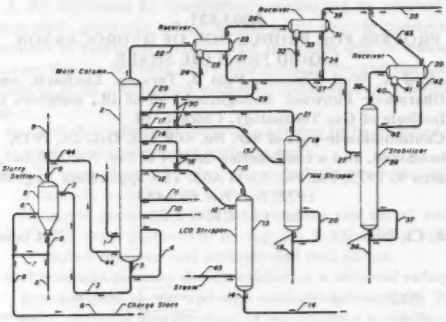
separating the aliphatic and alicyclic product liquids from the hydrogen-rich gas.

4,003,822

MAIN COLUMN SEPARATION OF FCC PRODUCT EFFLUENT

Hong-Kyu Jo, Des Plaines, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Jan. 26, 1976, Ser. No. 652,276
Int. Cl.² C10G *37/00*
U.S. Cl. 208—102 **7 Claims**



1. In a fluid catalytic cracking process, wherein a hydrocarbonaceous charge stock is converted into lower-boiling hydrocarbons in contact with finely-divided catalyst particles, the method of separating catalyst-containing, catalytically-cracked product effluent which comprises the steps of:

a. introducing said product effluent into a first fractionation column through a first locus in the bottom portion thereof;

b. withdrawing a light naphtha fraction from a second locus in the upper portion of said column, condensing and separating said light naphtha fraction to provide (i) a first vaporous phase and, (ii) a liquid phase;

c. recycling a first portion of said liquid phase, as a reflux stream, to said first column through a third locus below said second locus, and introducing a second portion into a second fractionation column;

d. separating said second portion to provide (i) a second vaporous phase and, (ii) a light naphtha product stream;

e. withdrawing a heavy naphtha fraction from said first column, through a fourth locus below said third locus, and introducing at least a portion thereof into a third fractionation column;

f. separating the portion of said heavy naphtha fraction to provide (i) a heavy naphtha bottoms product stream substantially free from light naphtha and, (ii) a light naphtha containing overhead stream;

g. introducing at least a portion of said overhead stream into said first column through a fifth locus intermediate said third and fourth loci; and,

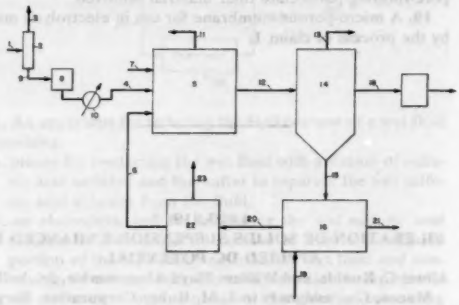
h. withdrawing a catalyst-containing slurry oil fraction from said first column through a sixth locus below said first locus.

4,003,823

COMBINED DESULFURIZATION AND HYDROCONVERSION WITH ALKALI METAL HYDROXIDES

William C. Baird, Jr., and Roby Bearden, Jr., both of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Apr. 28, 1975, Ser. No. 571,912
Int. Cl.² C10G *13/06;* B01J *27/04*
U.S. Cl. 208—108 **21 Claims**



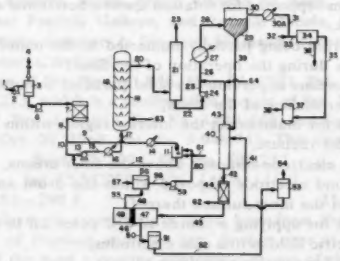
1. A process for the simultaneous desulfurization and hydroconversion of a sulfur-containing hydrocarbon feedstock containing at least 10 wt.% of materials boiling above about 1,050° F, which comprises contacting said hydrocarbon feedstock, substantially in a liquid state, with an alkali metal hydroxide in a conversion zone, in the presence of added hydrogen, said conversion zone being maintained at elevated temperatures ranging between 500°–1,500° F, whereby the sulfur and metals content of said hydrocarbon feedstock is reduced and wherein at least a portion of the 1,050° F+ fraction of said feedstock is converted to lower boiling products.

4,003,824

DESULFURIZATION AND HYDROCONVERSION OF RESIDUA WITH SODIUM HYDRIDE AND HYDROGEN

William C. Baird, Jr., and Roby Beardon, Jr., both of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Apr. 28, 1975, Ser. No. 571,913
Int. Cl.² C01G *13/06;* B01J *27/04*
U.S. Cl. 208—108 **17 Claims**



1. A process for the desulfurization and hydroconversion of

a sulfur-containing heavy petroleum oil feedstock containing at least 10 wt.% of components boiling above 1,050° F, which comprises contacting said sulfur-containing petroleum oil feedstock with sodium hydride at elevated temperatures in the presence of hydrogen, the hydrogen providing a hydrogen partial pressure within the range of from about 500 to about 5000 psig, said feedstock being maintained substantially in the liquid phase, to form an oil phase having a reduced sulfur content and a reduced Conradson carbon content, and a salt phase.

4,003,825

SYNTHETIC AMORPHOUS SILICAS OF PREDETERMINED PORE DISTRIBUTION, METHOD OF PRODUCING SAME AND PROCESS OF USING SAME

Thomas O. Mitchell, Trenton, and Darrell D. Whitehurst, Titusville, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 450,967, March 14, 1974, Pat. No. 3,983,055. This application Dec. 8, 1975, Ser. No. 638,405

Int. Cl.² C10G *13/02*; B01J *27/06*

U.S. Cl. 208—120 **27 Claims**

1. A shape-selective-cracking process wherein hydrocarbon feedstock is subjected to cracking conditions in the presence of a solid containing, at least in part, a synthetic amorphous solid having shape selective properties prepared by the steps of (1) hydrolzying, (2) polymerizing at up to 20° C in the presence of water a silane having the formula $R(Si)X_3$, wherein R is a nonhydrolyzable organic group, X is a hydrolyzable group and (Si) is selected from the group consisting of

$$-\overset{|}{\underset{|}{Si}}- \text{ and } -Si(R)_2-O-\overset{|}{\underset{|}{Si}}-,$$

and (3) calcining the polymerizing product said silane being admixed with a second compound, R'_nMY_m, wherein R' is selected from the group consisting of the same groups as R, Y is selected from the group consisting of the same groups as X and oxygen, M is a least one member selected from the group consisting of Groups IIIA, IVA, IVB, VA, VB, VIB, VIIB and VIII of the Periodic Table, *m* is any number greater than 0 and up to 8 and *n* is from 0 to any number less than 8.

4,003,826

HYDROCARBON CONVERSION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

George J. Antos, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 422,464, Dec. 6, 1973, Pat. No. 3,915,845. This application Oct. 28, 1975, Ser. No. 626,151

Int. Cl.² C10G *35/08*

U.S. Cl. 208—139 **20 Claims**

1. A process for converting a hydrocarbon which comprises contacting the hydrocarbon at hydrocarbon conversion conditions with an acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.01 to about 5 wt. % tin or lead, about 0.1 to about 3.5 wt. % halogen, and a lanthanide series component in an amount sufficient to result in an atomic ratio of lanthanide series component to platinum group metal of about 0.1:1 to about 1.25:1, wherein the platinum group metal, tin or lead, and lanthanide series component are uniformly dispersed throughout the porous carrier material, wherein substantially all of the platinum group metal is present in the elemental metallic state, wherein substantially all of the tin or lead is present in an oxidation state above that of the corresponding elemental metal, and wherein substantially all of the lanthanide series component is present in an oxidation state above that of the corresponding elemental metal.

4,003,827

MERCAPTAN CONVERSION PROCESS FOR A PETROLEUM DISTILLATE CHARGE STOCK

David H. J. Carlson, Park Ridge, and Peter Urban, Northbrook, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed June 12, 1975, Ser. No. 590,525

Int. Cl.² C10G *19/00*

U.S. Cl. 208—206 **14 Claims**

1. A process for the substantially complete conversion of mercaptan compounds to disulfide compounds in a petroleum distillate which comprises treatment of said distillate at a temperature of from about 15° C. to about 300° C. and a pressure of from about 1 atmosphere to about 100 atmospheres in an oxygen containing atmosphere and a medium possessing a pH of from about 8 to 14 in the presence of a catalyst consisting essentially of 4,4′,4″,4‴-cobalt phthalocyanine tetrasulfonate.

4,003,828

CATALYST AND PROCESS FOR REMOVING SULFUR AND METAL CONTAMINANTS FROM HYDROCARBON FEEDSTOCKS

Paul E. Eberly, Jr., Baton Rouge, La., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed July 23, 1975, Ser. No. 598,285

Int. Cl.² C10G *29/04*, *23/02*

U.S. Cl. 208—251 H **10 Claims**

1. A process for removing metal and sulfur contaminants from a feed stock which comprises (a) contacting a metal and sulfur contaminated feedstock in a conversion zone at 500–900° F in the presence of hydrogen with a catalyst comprising a hydrogenating component and a support component comprised of alumina having 1 to 6 wt.% phosphorus oxide expressed as P_2O_5 incorporated therein based on the weight of the alumina and incorporated phosphorus oxide and (b) recovering from said conversion zone a feedstock having a reduced metal and sulfur content.

4,003,829

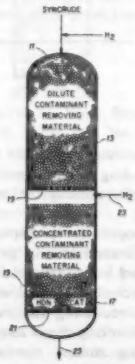
METHOD OF REMOVING CONTAMINANT FROM A HYDROCARBONACEOUS FLUID

Edward D. Burger; Daniel J. Curtin, both of Plano, Tex., and Robert R. Edison, Olympia Fields, Ill., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 548,516, Feb. 10, 1975, abandoned. This application June 2, 1975, Ser. No. 582,660

Int. Cl.² C10G *29/04*

U.S. Cl. 208—253 **6 Claims**



1. A method of removing a contaminant comprising at least one of arsenic and selenium from a synthetic hydrocarbonaceous fluid containing same comprising

a. preparing a guard bed having a plurality of sections; at least one section which is to be contacted by said fluid and contaminant first having from about 10 to about 75 percent by volume occupied by a contaminant-removing material composed of a carrier material carrying active material, the remainder being essentially an inert material different from said contaminant-removing material; said contaminant-removing material being particulate and consisting essentially of a material selected from the group consisting of iron, cobalt, nickel, at least one oxide thereof, at least one sulfide thereof, and combinations of two or more thereof; said inert material being stable at temperatures in excess of 850° F and inoperable to remove said contaminant from said fluid; said guard bed having a least one additional section having its volume substantially completely occupied by said contaminant-removing material for additional removal of contaminant from said hydrocarbonaceous fluid;

b. flowing said hydrocarbonaceous fluid through said first section of said guard bed under a reducing atmosphere, in the substantial absence of water, and an elevated temperature of from about 300° to about 550° F to effect a reduction in the concentration of said contaminant in said hydrocarbonaceous fluid and deposition of said contaminant in said first section of said guard bed; and, thereafter,

c. flowing the hydrocarbonaceous fluid reduced in said contaminant into contact with said at least one additional section of said guard bed under essentially the same conditions as step b. above except that the temperature in said at least one additional section is higher than the temperature in said first section and from about 550° to about 850° F to effect a further reduction of the concentration of said contaminant.

4,003,830

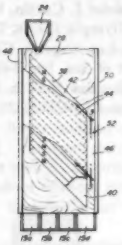
NON-FERROMAGNETIC MATERIALS SEPARATOR

Ernst F. R. A. Schloemann, Weston, Mass., assignor to Raytheon Company, Lexington, Mass.

Continuation-in-part of Ser. No. 509,203, Sept. 25, 1974, abandoned. This application Feb. 24, 1975, Ser. No. 552,576

Int. Cl.² B03B 1/00

U.S. Cl. 209—3 **28 Claims**



20. Materials separating apparatus for sorting commingled waste materials including ferromagnetic materials and nonferromagnetic electrically conductive materials, the apparatus comprising:

shredding means operatively disposed for receiving commingled waste materials and producing corresponding items of shredded waste materials;

guide means operatively disposed with respect to the shredding means for receiving the items of shredded waste materials and directing them into a stream;

magnetic attracting means operatively coupled to the stream for removing ferromagnetic items therefrom and converting it to a stream of nonferromagnetic items;

conducting means operatively disposed with respect to the magnetic attracting means for directing the stream of nonferromagnetic items along downwardly predetermined path; and

steady-state magnetic means operatively coupled to the path for establishing transversely at an oblique angle thereto at least one spatially alternating series of oppositely directed static magnetic fields in substantially parallel relationship with one another and inducing eddy currents in nonferromagnetic items of electrically conductive material, the eddy currents and associated magnetic fields producing force components means for moving the items of electrically conductive material laterally out of the stream in a uniform direction.

4,003,831

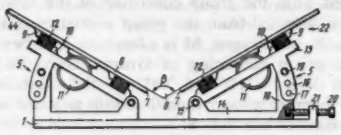
VIBRATION SCREEN

Anatoly Yakovlevich Tishkov, ulitsa Derzhavina, 19, kv. 67; Sergei Alexandrovich Fedorov, ulitsa 20 Partsiezda, 12, kv. 21; Anatoly Markovich Freidin, ulitsa Ippodromskaya, 31, kv. 9, all of Novosibirsk; Mikhail Zakharovich Latyshev, ulitsa Arsenieva, 98, kv. 20, Primorsky krai, Kavalerovsky raion, poselok Kavalerovo; Vitaly Markovich Grigoriev, ulitsa Tankovaya, 49, kv. 7, Novosibirsk; Jury Alexeevich Menshikov, ulitsa Arsenieva, 128, kv. 60, Primorsky krai, Kavalerovsky raion, poselok Kavalerovo; Andrei Andreevich Bovin, ulitsa 20 Partsiezda, 12, kv. 24, Novosibirsk; Vladimir Isaakovich Kreimer, ulitsa Voskhod, 7, kv. 73, Novosibirsk; Viktor Ananievich Chekushkin, ulitsa Zorge, 255, kv. 28, Novosibirsk; Vladimir Petrovich Lumpov, ulitsa Gorskaya, 41, Novosibirsk, and Dmitry Semenovich Alexeev, ulitsa Novogodnaya, 38, kv. 51, Novosibirsk, all of U.S.S.R.

Filed Sept. 20, 1974, Ser. No. 507,981

Int. Cl.² B07B 1/28

U.S. Cl. 209—315 **17 Claims**



1. In a classifier for classifying solid bodies according to size, a pair of oppositely inclined plates having upper rear receiving ends and lower front discharge ends and defining between themselves a trough along which material to be classified is adapted to flow from said upper rear receiving ends toward said lower front discharge ends of said plates, said plates having distant from each other outer side edges and adjacent each other inner side edges which are lower than said outer side edges and which define between themselves a gap through which bodies smaller than the width of said gap are adapted to fall while bodies too large to fall through said gap are discharged at the front discharge ends of said plates, a pair of conveyer means one of which is situated beneath said gap and the other of which is situated beneath said front discharge ends of said plates for respectively receiving the classified material and conveying the classified material respectively away from said gap and said front discharge ends of said plates, a pair of self contained vibrating means respectively connected operatively with said plates for vibrating the latter, support means for supporting said plates, and shock-absorbing means interposed between and engaging said support means and said plates, said support means supporting said plates only through said shock-absorbing means while said pair of vibrating means are respectively connected operatively with said plates but not to said support means so that said shock-absorbing means insulates said support means from said plates and so that the vibrations of one of said plates is not transmitted to the other of said plates.

4,003,832

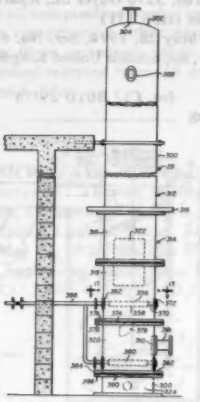
METHOD OF APPLYING OZONE AND SONIC ENERGY TO STERILIZE AND OXIDIZE WASTE WATER

Angus D. Henderson, Bayside, and John M. Periale, Central Islip, both of N.Y., assignors to TII Corporation, Lindenhurst, N.Y.

Continuation of Ser. No. 431,012, Jan. 7, 1974, abandoned. This application Nov. 24, 1975, Ser. No. 634,874

Int. Cl.² C02B *3/08*; C02C *5/06*

U.S. Cl. 210—19 6 Claims



1. A method of treating waste water having entrained solids and dissolved contaminants therein, comprising the steps of:

adding a coagulating agent to said waste water;

adding a polyelectrolyte to said waste water to form a floc;

then passing said waste water through a lamina to remove a substantial portion of any solids suspended therein;

passing said waste water in a counter-flow through a large gravity gradient stand of water; and

subjecting said waste water to the pre-treatment of ozone and sonic energy to cause cavitation therein, said waste water being subject to said cavitation at increasing energy levels while it encounters increasing concentrations of said ozone;

forcing said waste water through a restriction into a hydraulic gradient of water and subjecting said waste water to highly confined and increasingly concentrated quantities of ozone in the presence of high ultransonic energy at increasing energy levels to effect cavitation within said waste water for effective sterilization and oxidation of said waste water.

4,003,833

DETOXIFICATION OF AQUEOUS WASTE STREAMS CONTAINING CYANIDE

James V. Cavender, Jr., Texas City, Tex., assignor to Monsanto Company, St. Louis, Mo.

Filed May 24, 1976, Ser. No. 689,695

Int. Cl.² C02C *5/02*

U.S. Cl. 210—59 10 Claims

1. The method of treating an aqueous stream containing cyanide wastes in a concentration of up to about 1000 ppm of said contaminant which comprises contacting said stream with formaldehyde and a compound which will generate HSO_3^- at a temperature from about 80° to about 135° C while maintaining the pH of the reaction mixture in the range from about 8 to about 12 for a period of time sufficient to reduce the cyanide content to less than 1 ppm using a $HCHO/CN^-$ molar ratio of at least one and an HSO_3^-/CN^- molar ratio from about 1.0 to about 1.5.

4,003,834

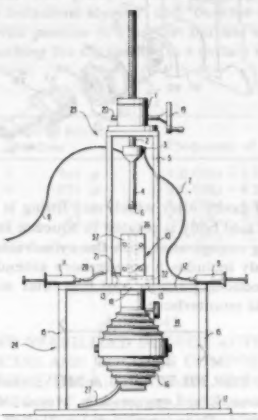
DENSITY GRADIENT FRACTIONATION BY PISTON DISPLACEMENT

David H. Coombs, Corvallis, Oreg., assignor to The United States of America as represented by the Secretary of the Department of Health, Education and Welfare, Washington, D.C.

Filed Mar. 31, 1975, Ser. No. 563,513

Int. Cl.² G01N *1/02*

U.S. Cl. 210—83 14 Claims



1. A fractionation apparatus for the fractionation of a density gradient of liquids comprising:

a gradient holder having a centrifuge tube hole for receiving a centrifuge tube containing a density gradient of liquids having individual bands;

a black, rigid displaceable piston of external diameter equal to the internal diameter of the centrifuge tube suspended above said holder, said piston having at least one opening passing therethrough and having sealing means thereabout to prevent liquid from escaping by the piston when it is displaced within the tube;

a collection means connected to said displaceable piston for collecting the density gradient through said opening;

actuator means connected to said displaceable piston for incrementally and accurately lowering said piston into and for raising said piston from the density gradient within the centrifuge tube; and

illuminating means placed under said gradient holder for illumination of the density gradient to determine the exact position of each individual band.

4,003,835

FITTINGS

Harley D. Johnson, 708-9th St. West, Bradenton, Fla. 33505

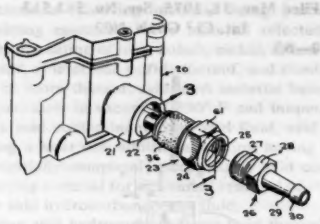
Filed Aug. 18, 1975, Ser. No. 605,450

Int. Cl.² B01D *35/02*

U.S. Cl. 210—232 4 Claims

1. A sealable fuel inlet fitting for connecting a fuel line to a carburetor having an open cavity with a generally cylindrical wall and a bottom wall, said fitting comprising a body having a portion for engaging said carburetor adjacent to said cavity, said body having a reduced threaded portion connected to said carburetor engaging portion by a chamfered frusto-conical surface, said reduced portion and said chamfered surface extending into said cavity, a cone nut threadedly engaging said reduced portion of said body, said cone nut having a chamfered frusto-conical surface in spaced facing relationship with said chambered surface of said body, a resilient generally tubular seal member having an outer wall with a diameter less than the diameter of the cylindrical wall of said cavity and an

inner wall with a diameter greater than said reduced portion of said body, said seal member extending between said chamfered surfaces of said body and said cone nut, and said body having a bore extending axially therethrough, whereby said cone nut is rotated to squeeze said seal member and force the opposite ends outwardly to provide a snug fit with the cylindrical wall of said cavity after which said fitting is inserted into said cavity and said body is rotated to squeeze said seal member into sealing engagement with the cylindrical wall of said cavity, said body includes a counterbore extending inwardly through said reduced portion, and fuel filter means slidably mounted in said counterbore.



4,003,836

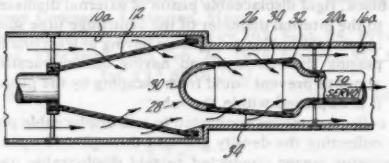
DEVICE FOR FILTERING A MOVING FLUID

Charles F. Stearns, East Longmeadow, Mass., and Kenneth P. Hansen, Enfield, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 518,593, Oct. 25, 1974, abandoned. This application Apr. 15, 1976, Ser. No. 677,334

Int. Cl.² B01D *35/02*

U.S. Cl. 210—247 **2 Claims**



1. A device for filtering a portion of the fluid from a moving fluid stream comprising:

a. conduit means having a wall defining a passageway with a fluid inlet for axially receiving the moving fluid stream, and a first outlet axially spaced downstream in the flow from said inlet;

b. filter means in said passageway for filtering relatively coarse particles from said moving fluid stream; and

c. a tapered plug mounted within the passageway downstream of said filter means in spaced relation to said wall to form an annular passageway between said plug and said wall which is convergent in the direction of flow of said stream and communicating with said first outlet, said plug having a fluid-impervious dome-shaped nose portion adjacent said inlet, the plug cooperating with the conduit means to accelerate the flow of fluid and to direct particles entrained in the fluid generally outwardly in said annular passageway toward the wall and said first outlet, said plug having a frusto-conically shaped hollow body portion the smaller end of which is attached to said nose portion, said body portion made from a fluid filtering material pervious to the flowing fluid adapted to bleed a portion of said flowing fluid therethrough to filter relatively fine particles therefrom, said plug including a fluid impervious base attached to the larger end of said hollow body portion and having an opening leading to a second outlet, said opening adapted to receive the fluid which is bled through said pervious body portion of said plug.

4,003,837

SELF-CLEANING STRAINER

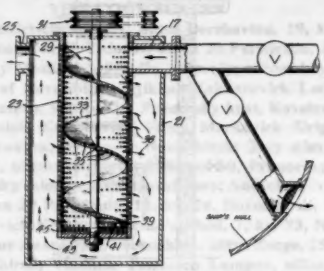
Winston G. Osborne, 3270 Goyer St., Apartment 5, Montreal, Quebec, Canada (H3S 1J1)

Filed May 28, 1974, Ser. No. 474,138

Claims priority, application United Kingdom, May 29, 1973, 25385/73

Int. Cl.² B01D *29/38*

U.S. Cl. 210—408 **7 Claims**



1. A self-cleaning strainer for reducing the size of foreign objects in a fluid used in the cooling system of a ship comprising:

a. a fluid inlet;

b. a fluid outlet;

c. a screen receiving fluid from said inlet;

d. spiral screw means on the inlet side of said screen for keeping said screen free of foreign objects;

e. said spiral screw means having a first crushing means comprising a serrated edge thereon for grinding and crushing foreign matter on the inlet side of said screen, whereby said foreign matter is reduced in size and passes through said screen;

f. a second crushing means at an axial end of said spiral screw means for crushing foreign matter that is not ground and crushed by said serrated edge on said spiral screw, and

g. a casing surrounding said screen for conveying the fluid and reduced foreign matter therefrom to said outlet.

4,003,838

WATER LOSS REDUCTION AGENTS

Jack M. Jackson, Houston, and Arlynn H. Hartfiel, Alvin, both of Tex., assignors to Chemical Additives Company, Houston, Tex.

Continuation of Ser. No. 355,166, April 27, 1973, abandoned. This application Oct. 3, 1975, Ser. No. 619,203

Int. Cl.² C09K *7/02*

U.S. Cl. 252—8.5 A **6 Claims**

1. An aqueous clay-free, non-thixotropic wellbore fluid having improved fluid loss control at high temperatures for use in subterranean formations in the earth consisting essentially of water, at least 1% of a brine forming soluble salt or mixture of salts of potassium, sodium or calcium and hydroxypropyl ether starch in an amount sufficient to provide water loss control.

4,003,839

NON-FOAMING LUBRICATION OIL

Jan Willem van Hesden, Baulkham Hills, Australia, assignor to Borg-Warner Corporation, Chicago, Ill.

Filed May 9, 1974, Ser. No. 468,603

Claims priority, application Australia, May 31, 1973, 3505/73

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² C10M 1/10

U.S. Cl. 252—25 4 Claims

1. A lubrication oil composition having improved resistance to foaming in use comprising a lubrication oil and a foam-preventing amount of an annydrous alkali metal or alkaline earth metal compound selected from the group consisting of oxides, sulfates and halides.

4,003,840

MICROWAVE ABSORBER

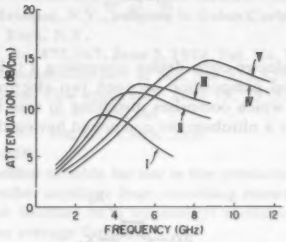
Ken Ishino, Nagareyama; Takashi Watanabe, Tokyo, and Yasuo Hashimoto, Ichikawa, all of Japan, assignors to TDK Electronics Company, Limited, Tokyo, Japan

Filed May 12, 1975, Ser. No. 576,697

Claims priority, application Japan, June 5, 1974, 49-63786

Int. Cl.² B65D 43/00; C04D 21/00

U.S. Cl. 252—62 8 Claims



1. A microwave absorber consisting essentially of a mixture of from 0.2 to 0.9 part by volume of a ferrite powder and from 0.8 to 0.1 part by volume of an organic high molecular compound, said ferrite powder being a powder having a particle size of less than 1.65 mm of a ferrite having the general formula MFe_2O_4 in which M is selected from the group consisting of manganese, nickel, copper, zinc, magnesium and cobalt and having an initial permeability of more than 300 at 10 kHz, said organic high molecular compound being a thermosetting resin selected from the group consisting of phenol resin, polyester resin, epoxy resin and silicone resin; or a thermoplastic resin selected from the group consisting of polyvinyl chloride, polyethylene and polypropylene; or a natural and synthetic rubber selected from the group consisting of polychloroprene, acrylonitrile-butadiene-styrene and fluorine-contained rubber, said ferrite powder in a certain particle size range being used for absorbing the microwave in a certain frequency range as shown below:

Particle size of ferrite powder			Frequency of microwave
1.65 mm	–	701 μ	500 MHz – 1.5 GHz
701 μ	–	351 μ	1.0 GHz – 2.0 GHz
351 μ	–	104 μ	1.8 GHz – 3.0 GHz
104 μ	–	43 μ	2.5 GHz – 7.5 GHz
<43 μ			6.0 GHz – 12.0 GHz.

5. A microwave absorber consisting essentially of a mixture of from 0.2 to 0.9 part by volume of a ferrite powder and from 0.8 to 0.1 part by volume of an organic high molecular compound, said ferrite powder being a powder having a particle size of less than 1.65 mm of a ferrite having the general formula MFe_2O_4 in which M is selected from the group consisting of manganese, nickel, copper, zinc, magnesium and cobalt and having an initial permeability of less than 300 at 10 kHz, said organic high molecular compound being a thermosetting resin selected from the group consisting of phenol resin, polyester resin, epoxy resin and silicone resin; or a thermoplastic resin selected from the group consisting of polyvinyl chloride, polyethylene and polypropylene; or a natural and synthetic rubber selected from the group consisting of polychloroprene, acrylonitrile-butadiene-styrene and fluorine-contained rubber, said ferrite powder in a certain particle size range being used for absorbing the microwave in a certain frequency range as shown below:

Particle size of ferrite powder			Frequency of microwave
1.65 mm	–	701 μ	1.0 GHz – 3.0 GHz
701 μ	–	351 μ	2.0 GHz – 4.5 GHz
351 μ	–	104 μ	4.0 GHz – 6.0 GHz
104 μ	–	43 μ	5.0 GHz – 7.5 GHz
<43 μ			6.0 GHz – 12.0 GHz.

4,003,841

COATED STABILIZED BLEACH ACTIVATORS, PROCESS AND WASHING COMPOSITIONS

Klaus Hachmann, Hilden; Rolf Puchta, Haan, and Gerhard Sperling, Hilden, all of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

Filed Aug. 6, 1975, Ser. No. 602,138

Claims priority, application Austria, Aug. 14, 1974, 6646/74

Int. Cl.² C11D 3/395, 7/18

U.S. Cl. 252—94 14 Claims

1. A coated stabilized bleaching assistant suitable for use in pulverulent washing and bleaching compositions comprising drop-shaped to globular-shaped particles having an average diameter of 0.01 mm to 2.5 mm, and at least 70% of which have a diameter within the range of 0.1 to 1 mm consisting essentially of 10 to 70% by weight of at least one activator for active oxygen derived from compounds yielding H_2O_2 in aqueous solutions having an activating action of at least 3 in the Per-Acid Formation Test selected from the group consisting of (1) N-acyl compounds having 2 to 9 carbon atoms in the acyl, (2) O-acyl compounds having 2 to 9 carbon atoms in the acyl, wherein acyl is an organic group of the formula

$$R - CO -$$

wherein R designates the hydrocarbon radical with from 1 to 8 carbon atoms, optionally substituted with alkoxy having 1 to 3 carbon atoms, halo, nitro or cyano, (3) carbonic acid esters of the formula

$$X - O - CO - O - R$$

wherein X is an electron-attracting residue selected from the group consisting of p-carboxyphenyl, p-sulfophenyl and alkoxycarbonyl with 1 to 4 carbon atoms in the alkoxy and R has the above-assigned values, and (4) pyrocarbonic acid esters of C_1 to C_4 alkanols, substantially surrounded by from 30 to 90% by weight of a mixture of (a) from 2 to 10 parts by weight of said mixture of acids having substantially from 12 to 24 carbon atoms selected from the group consisting of substantially saturated fatty acids, saturated hydroxy fatty acids, and mixtures thereof, (b) 1 part of weight of said mixture of alcohols selected from the group consisting of substantially saturated hydrocarbon monohydric alcohols having from 10 to 20 carbon atoms, their ethoxylated products, their propoxylated products and mixtures thereof, where the alkoxylated products are water-insoluble and have from 1 to 5 alkoxy units, and

(c) from 5 to 25% by weight of said mixture of water-soluble sulfates of alcohols selected from the group consisting of substantially saturated hydrocarbon monohydric alcohols having from 8 to 18 carbon atoms, their ethoxylated products, their propoxylated products and mixtures thereof, where the alkoxylated products have from 1 to 5 alkoxy units.

4,003,842
CORROSION AND SCALE INHIBITORS FOR INDUSTRIAL RECIRCULATING COOLING WATER SYSTEMS

Tzeng Jiueq Suen, New Canaan, and Arthur James Begala, Jr., Fairfield, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

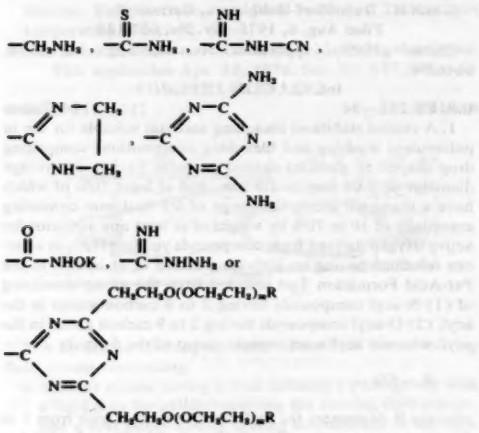
Filed July 14, 1975, Ser. No. 595,651
Int. Cl.² C02B 5/00
U.S. Cl. 252—175 **5 Claims**

1. A process for inhibiting corrosion and scaling on metal surfaces in water systems comprising: adding to water in said systems an effective amount of additive selected from compounds having the formula:

$$R(OCH_2CH_2)_mOCH_2CH_2Z$$

wherein:

R is a hydrocarbon radical having 8 – 22 carbon atoms;
m is a value from 1 to 6; and
Z is — COOM, where *M* is H or an alkali metal,



where *m* and *R* are as defined above.

4,003,843
VULCANIZATION SYSTEMS FOR RUBBER MIXTURES WITH LIGHT FILLERS

Theo Kempermann, Cologne, and Gunter Marwede, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed June 17, 1975, Ser. No. 587,415
Claims priority, application Germany, June 21, 1974, 2429818
Int. Cl.² C08K 9/06, 5/54, 5/47, 5/40
U.S. Cl. 252—182 **4 Claims**

1. An accelerator mixture for the sulphur vulcanisation of rubbers comprising:

a. 0.1 to 4.0 parts by weight of a silane corresponding to the formula $(R_1O)_3SiR_2$ or $(R_1O)_3SiR_3Si(OR_1)_3$, in which R_1 represents a hydrocarbon radical, R_2 represents a monovalent sulphur-containing hydrocarbon radical and R_3 represents a divalent sulphur-containing hydrocarbon radical;

b. 1.0 to 4.0 parts by weight of a thiazole accelerator;

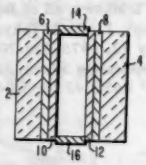
c. 1.0 to 4.0 parts by weight of a guanidine accelerator; and

d. 0.1 to 1.0 part by weight of a thiuram accelerator.

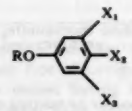
4,003,844
LIQUID CRYSTAL DEVICES

Howard Sorkin, Berkeley Heights, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 17, 1975, Ser. No. 632,815
Int. Cl.² C09K 3/34; G02F 1/13
U.S. Cl. 252—299 **16 Claims**



1. In an electro-optic device comprising a twisted nematic liquid crystal composition between two electrodes, the improvement which comprises dissolving in said liquid crystal composition a nitrobenzene compound having the formula



wherein R is an alkyl radical of 1–20 carbon atoms X_1 and X_3 independently can be hydrogen or nitro, X_2 can be hydrogen, nitro, or $-O-CH_2CN$ with the proviso that at least one of X_1, X_2 or X_3 is a radical other than hydrogen, in an amount effective to lower the threshold voltage of said device.

4,003,845
LUMINESCENT MATERIAL

Petrus Franciscus Josef van den Boom, and Albert Leendert Nicolaas Stevels, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 9, 1976, Ser. No. 675,441
Claims priority, application Netherlands, Apr. 16, 1975, 7504502
Int. Cl.² C09K 11/46; H01J 1/63
U.S. Cl. 252—301.4 R **4 Claims**

1. A luminescent material consisting essentially of a luminescent cerium- and manganese-activated aluminate having a composition defined by the formula $La_{1-x-p}Ba_xCe_pAl_{y-q}M-n_qO_{1.5y+1.5-0.5x-0.5q}$
where
$10 \leq y \leq 13$
$0.10 \leq x \leq 0.75$
$0.05 \leq p \leq 0.75$
$(x+p \leq 0.90$
$0.10 \leq q \leq 0.50.$

4,003,846

PROCESS FOR THE ENCAPSULATING OF SUBSTANCES IMMISCIBLE WITH WATER

Martin Kuhn, Birsfelden, and Melvin Harris, Dornach, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 13, 1974, Ser. No. 523,634

Claims priority, application Switzerland, Nov. 16, 1973, 16174/73

Int. Cl.² B01J *13/02*

U.S. Cl. 252—316 5 Claims

1. A process for the encapsulating of substances immiscible with water, wherein the substance to be encapsulated is dispersed in a distribution medium in the presence of an aqueous solution of a polyacrolein or acrolein copolymer present as hydrate or bisulphite adduct, which aqueous solution is capable of forming a compound insoluble in the distribution medium; and the hydrate or the bisulphite adduct is reacted in the resulting dispersion with an alkyleneamine having 2 to 5 amino groups, which are separated by straight-chair or branched-chain alkylene groups having 2 to 6 carbon atoms to form an insoluble capsule material.

4,003,847

SOLVENT SOLUTIONS OF SILOXANE FLUIDS

Bela Prokai, Mahopac, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 475,967, June 3, 1974, Pat. No. 3,905,924, which is a continuation-in-part of Ser. No. 325,327, Jan. 22, 1973, abandoned. This application June 19, 1975, Ser. No. 588,345

Int. Cl.² C09K *3/00*

U.S. Cl. 252—350 6 Claims

1. A composition suitable for use in the production of high resilience polyether urethane foam consisting essentially of an organic solvent solution of a cyanoalkyl modified siloxane fluid having the average formula

$$(X)_3R_{3-z}SiO(R_2SiO)_x[(X)(R)SiO]_ySiR_{3-z}X_z$$

wherein x has a value of 1 of 6 inclusive; y has a value of 0 to 6 inclusieve; z has a value of 0 to 1 inclusive; R is a lower alkyl or phenyl radical; and X is a cyanoalkyl radical of the formula $-(O)_nR'CN$ where n has a value of 0 to 1 and R′ is an alkylene radical having from 2 to 4 carbon atoms; said siloxane fluid containing at least one of said cyanoalkyl radicals and having an average molecular weight in the range of about 400 to about 1500, said solution containing at least 5 parts by weight of said siloxane fluid per 95 parts by weight of said solvent, and wherein the organic solvent is an organic polyether selected from the group consisting of mono-ol, diol and triol hydroxy compounds.

4,003,848

METHOD FOR THE ADSORPTION OF SULFUR DIOXIDE

Robert James Cotter, Bernardsville; Michael John Keogh, Somerville, and William Donald Heitz, Flagtown, all of N.J., assignors to Union Carbide Corporation, New York, N.Y.

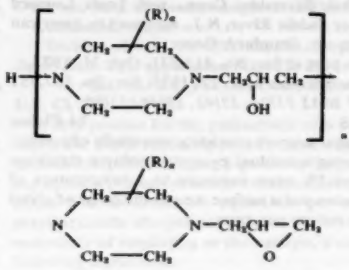
Continuation-in-part of Ser. No. 531,398, Dec. 10, 1974, abandoned, which is a division of Ser. No. 489,126, July 17, 1974, Pat. No. 3,876,395, which is a continuation-in-part of Ser. No. 448,999, March 7, 1974, abandoned. This application Feb. 9, 1976, Ser. No. 656,256

Int. Cl.² B01J *31/02*, *31/02*; B01D *39/00*, *53/02*

U.S. Cl. 252—427 30 Claims

1. Method of fabricating an article which adsorbs SO_2 from gas mixtures which comprises

1. depositing on a support, having a high surface area, an oligomer having the structure:



wherein each R is a lower alkyl group having up to about 8 carbon atoms, a is an integer having values of 0 to 4 and n is an integer having values of about 2 to about 20; and

2. heating the resultant combinatin of (1) above room temperature until the oligomer is converted to a water-insoluble, crosslinked polymer.

4,003,849

LEAD/CHLORIDE/ALUMINA ISOMERIZATION CATALYST FOR GASOLINE

William T. Nelson, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 526,940, Nov. 25, 1974, Pat. No. 3,929,623. This application June 9, 1975, Ser. No. 585,162

Int. Cl.² B01J *27/06*; C10G *35/06*

U.S. Cl. 252—442 5 Claims

1. A platinum-free catalyst consisting essentially of

1. an alumina base;

2. chlorine in an amount within the range of 0.1 to 5 weight percent calculated as hydrogen chloride based on the weight of said catalyst; and

3. 0.01 to 5 weight percent lead calculated as PbO based on the weight of said catalyst.

4,003,850

NOVEL IRON OXIDE CATALYSTS

Robert H. Callighan, Verona, and John O. Hawthorne, Penn Hills Township, both of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 186,557, Oct. 4, 1971, abandoned. This application Aug. 23, 1973, Ser. No. 390,979

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² B01J *29/06*

U.S. Cl. 252—455 R 6 Claims

1. A process for preparing an iron oxide catalyst comprising:

a. adding iron carbonyl to an inert carrier gas,

b. flowing the carbonyl containing carrier gas over a suitable support to deposit the carbonyl onto the support at a rate such that the temperature remains in the range of about 0° – 100°C for a period of time sufficient to saturate the support, and

c. flowing an oxidizing gas over the support while maintaining the temperature below 100°C to oxidize the adsorbed carbonyl to iron oxide.

4,003,851

STABLE ALUMINA CATALYST SUPPORT, PROCESS THEREFOR, AND PROMOTED SUPPORT

Robert Henry Ebel, Riverside, Conn., and Louis Leonard Lento, Jr., Upper Saddle River, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 411,531, Oct. 31, 1973, abandoned. This application Mar. 12, 1975, Ser. No. 557,551

Int. Cl.² B01J 21/04, 23/42, 23/44, 23/86

U.S. Cl. 252—465 14 Claims

1. A stable catalyst support consisting essentially of precipitated alumina having a residual geometric volume shrinkage of less than about 5% upon exposure to a temperature of 1800° F. for 24 hours and a surface area in the range of about 75 to 120 square meters per gram.

4,003,852

NONACIDIC MULTIMETALLIC DEHYDROGENATION CATALYST

John C. Hayes, Palatine, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 458,607, April 8, 1974, Pat. No. 3,936,395, which is a division of Ser. No. 365,877, June 1, 1973, Pat. No. 3,856,870, which is a continuation-in-part of Ser. No. 27,457, April 10, 1970, abandoned. This application Jan. 8, 1976, Ser. No. 647,461

Int. Cl.² B01J 21/04, 23/58

U.S. Cl. 252—466 PT 8 Claims

1. A nonacidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to 2 wt. % iridium, about 0.01 to about 5 wt. % tin or lead, and about 0.1 to about 5 wt. % of an alkali or alkaline earth metal; wherein the platinum or palladium, iridium, tin or lead, and alkali or alkaline earth metal are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum or palladium and iridium are present in the corresponding elemental metallic state; wherein substantially all of the tin or lead is present in an oxidation state above that of the elemental metal; and wherein substantially all of the alkali or alkaline earth metal is present in an oxidation state above that of the elemental metal.

4,003,853

METHOD OF ACTIVATING A SUPPORTED OLEFIN CONVERSION CATALYST

Martin Cherubim, Rheinkamp-Eick; Elmar Wilms, Kamp-Lintfort, and Hans Arendsen, Homberg, all of Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Germany

Division of Ser. No. 529,182, Dec. 3, 1974, Pat. No. 3,961,490. This application Oct. 31, 1975, Ser. No. 627,644

Claims priority, application Germany, Dec. 7, 1973, 2360981

Int. Cl.² B01J 23/24, 23/32, 23/78, 23/04

U.S. Cl. 252—467 9 Claims

1. A method of activating a supported catalyst comprising a member selected from the group consisting of oxides of metals of Group VB, Group VIB, Group VIIB and the iron group and used for the conversion of olefins characterized by calcining the supported catalyst at a temperature of from 300° to 800° C. impregnating said calcined catalyst with an alcoholic solution of a member selected from the group consisting of alkali metal salts, alkali metal bases and alkali metal alcoholates, and subsequently repeating the calcination of said catalyst at temperatures of from 400° to 700° C. for from 0.5 to 8 hours.

4,003,854

CATALYST OF SUPPORTED VANADIUM OXIDE AND MANGANESE OXIDE AND METHOD OF PRODUCING SAME

Gennady Alexeevich Skvortsov, ulitsa Kima, 32, kv. 50; Nellya Nikitichna Nizeeva, ulitsa Lermontova, 17, kv. 4; Avrum Iosifovich Podzharsky, ulitsa Juzhnaya, 12, kv. 10, and Irma Viktorovna Dobrovolskaya, ulitsa Prokhodnoi tupik, 3, kv. 2a, all of Dneprodzerzhinsk Dnepropetrovskoi oblasti, U.S.S.R.

Filed June 3, 1974, Ser. No. 476,044

Int. Cl.² B01J 23/22, 23/34

U.S. Cl. 252—471 4 Claims

1. A catalyst for selective removal of nitrogen oxides from waste gases, said catalyst consisting essentially of a mixture oxides of vanadium and of manganese applied to an inert carrier, said oxides being taken in the weight ratio V_2O_5/Mn_2O_3 of 0.1 – 30:1, the total content of the metal oxides being 5 – 40 percent of the total weight of the catalyst.

4,003,855

NONLINEAR RESISTOR MATERIAL AND METHOD OF MANUFACTURE

Joe Wong, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed June 23, 1975, Ser. No. 589,430

Int. Cl.² H01B 1/08

U.S. Cl. 252—519 8 Claims

1. A method of controlling the breakdown voltage of a polycrystalline zinc oxide varistor of the type comprising a sintered mixture of zinc oxide, bismuth oxide, and materials selected from the group consisting of transition metal oxides and post-transition metal oxides comprising the step of

sintering said mixture at a temperature between approximately 1100° C and approximately 1415° C for a period of time between 1 hour and approximately 48 hours, said period of time being chosen as an inverse function of a desired breakdown voltage characteristic of said varistor whereby the zinc oxide grain size in said varistor is caused to vary in approximate proportion to the one-sixth power of said period of time.

4,003,856

OIL-SOLUBLE COMPOSITION FOR REMOVING IRON SULFIDE AND SLUDGE FROM METAL SURFACES

Thomas L. Sharp, 715 Nenana St., Houston, Tex. 77035

Filed Sept. 23, 1974, Ser. No. 508,674

Int. Cl.² C11D 1/40

U.S. Cl. 252—546 4 Claims

1. An oil-soluble composition capable of removing iron sulfide and sludge from metal surfaces in an oil system comprising:

a. from about 2 to about 15% by weight of a high molecular weight linear diamine derived from a higher fatty acid containing from 12 to 30 carbon atoms;

b. from about 3 to about 20% by weight of acetic acid;

c. from about 20 to about 50% by weight of a low molecular weight ketone ether solvent containing from 4 to 8 carbon atoms;

d. from about 1 to about 15% by weight of an alcohol solvent selected from monohydric hydrocarbon alcohols of up to 6 carbon atoms and diacetone alcohol; and

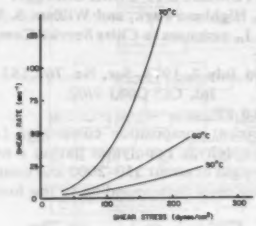
e. from about 20 to about 50% by weight of a heavy aromatic naphtha solvent having a specific gravity of 0.885 to 0.970 and a boiling point within the range of 160°–220° C.

4,003,857

CONCENTRATED AQUEOUS OLEFINS SULFONATES CONTAINING CARBOXYLIC ACID SALT ANTI-GELLING AGENTS

Richard D. Gorsich, and William J. DeWitt, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Dec. 17, 1973, Ser. No. 425,198
Int. Cl.² C11D 1/14, 1/37, 3/20, 11/04
U.S. Cl. 252—546 12 Claims



1. A composition of matter consisting essentially of, on weight percent basis:

A. from about 50 to about 70 percent of olefin sulfonate having from about 10 to about 24 carbon atoms per molecule,

B. from about 3 to about 50 percent of salt of the formula HCOOM wherein M is alkali metal, ammonium, lower alkanol ammonium or lower alkyl ammonium, and

C. from about 5 to about 57 percent water.

4,003,858

PROCESS FOR PRODUCING EXPANDIBLE STYRENE POLYMERS USEFUL IN THE MANUFACTURE OF SHAPED CELLULAR ARTICLES

Gianfranco Biglione; Antonio Alvares, both of Mantova, and Guido Bertazzoni, Campitello di Marcaria (Mantova), all of Italy, assignors to Montedison Fibre S.p.A., Milan, Italy

Filed Dec. 20, 1974, Ser. No. 534,776
Claims priority, application Italy, Dec. 24, 1973, 54581/73
Int. Cl.² C08J 9/02, 9/16, 9/22
U.S. Cl. 260—2.5 HB 9 Claims

1. In the process for making molded bodies of styrene polymers consisting of the following steps in the order stated: polymerization of styrene or of mixtures of styrene with other monomers copolymerizable with it; addition of an expanding agent; treatment of the expandible particles with an agglomeration inhibitor for avoiding agglomeration of the particles prior to expansion thereof; pre-expansion of the expandible particles; ageing of the pre-expanded particles; and molding of the pre-expanded and aged particles in a mold which is pressure resistant but not gas-tight, the improvement which consists in carrying out the polymerization, the treatment of the expandible particles prior to pre-expansion thereof, or both the polymerization and the treatment of the expandible particles prior to pre-expansion thereof, in the presence of 0.005 to 0.5 parts by weight of dimers or trimers of unsaturated fatty acids C_{18} or esters thereof with C_1–C_{18} alcohols per 100 parts by weight of the styrene or styrene-containing polymerizable mixture.

4,003,859

NOVEL PROCESS FOR TRIMERIZING POLYISOCYANATES

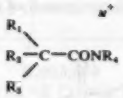
Harold E. Reymore, Jr., Wallingford, and John K. Zane, East Haven, both of Conn., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 437,781, Jan. 30, 1974, Pat. No. 3,899,443. This application May 19, 1975, Ser. No. 578,428
Int. Cl.² B01J 31/12; C08G 18/18, 18/24
U.S. Cl. 260—2.5 AC 16 Claims

1. In a process for the preparation of a cellular polymer in which the major recurring polymer unit is isocyanurate which process comprises bringing together in the presence of a blowing agent, a polyisocyanate, a trimerization catalyst, and from about 0.01 to about 0.3 equivalent per equivalent of said polyisocyanate of a polyol, wherein the improvement consists essentially of employing as the catalyst, a combination of the following ingredients:

a. from 0.005 to 0.04 equivalent per equivalent of said polyisocyanate of a tertiary amine trimerization catalyst;

b. from 0.001 to 0.03 equivalent per equivalent of said polyisocyanate of an amide salt having the formula



wherein M is an alkali metal, R_1, R_2, R_3 can be the same or different and are selected from the group consisting of H, lower alkyl, aryl, aralkyl, and cycloalkyl, R_4 is selected from the group consisting of lower alkyl and aryl; and

c. from 0.0005 to 0.005 equivalent per equivalent of said polyisocyanate of a dibutyl tin di(alkanoate) wherein the alkanoate residue contains from 2 to 12 carbon atoms, inclusive.

4,003,860

NONSHRINK CELLULAR RUBBER COMPOSITION

André LeClerc, Overijse, Belgium, assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed June 9, 1975, Ser. No. 585,163
Int. Cl.² C08J 9/10
U.S. Cl. 260—2.5 HA 9 Claims

1. A foamable blend consisting essentially of:

a. a monovinyl-substituted aromatic compound/diene block copolymer, said monovinyl-substituted aromatic compound having 8 to 18 carbon atoms per molecule and said diene having 4 to 12 carbon atoms per molecule, said copolymer having 40 to 80 weight percent diene;

b. an ethylene/vinyl acetate copolymer, said copolymer having 10 to 50 weight percent vinyl acetate;

c. a blowing agent; and

d. a curing agent,

said component (a) being present in an amount sufficient to give 10 to 30 weight percent block styrene homopolymer in said total blend of polymers and a ratio of said component (a) to (b) being within the range of 10/90 to 90/10.

4,003,861
MELAMINE PYROPHOSPHATE AS FLAME-RETARDANT IN POLYURETHANE FOAM COMPOSITIONS

Christos Savides, and Joseph Frederick Cannelongo, both of Piscataway, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 393,374, Aug. 31, 1973, abandoned, which is a continuation of Ser. No. 261,187, June 9, 1972, abandoned. This application July 9, 1975, Ser. No. 594,470

Int. Cl.² C08G *18/14, 18/48;* **C08K** *5/52, 5/34*

U.S. Cl. 260—2.5 AJ **10 Claims**

1. A flame-retarded composition comprising a foamed polyurethane resin derived solely from the coreaction of a phosphorus-free and nitrogen-free polyol and an aromatic diisocyanate and containing from about 12 to about 20 parts, by weight, of melamine pyrophosphate salt per 100 parts of polyol.

4,003,862
N-SUBSTITUTED TETRAHALOPHTHALIMIDES AS FLAME RETARDANTS

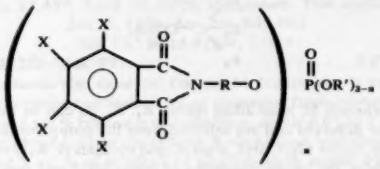
James A. Albright, Ann Arbor, Mich., assignor to Michigan Chemical Corporation, Chicago, Ill.

Filed Oct. 23, 1975, Ser. No. 625,052

Int. Cl.² C07D *209/48;* **C08K** *5/34, 5/52*

U.S. Cl. 260—2.5 AJ **11 Claims**

1. A flame retardant compound of the formula



wherein each X is independently selected from chlorine or bromine, R is an alkylene group containing from 1 to 6 carbon atoms, each R′ is independently selected from an alkyl or haloalkyl group containing from 2 to 6 carbon atoms, and wherein the haloalkyl group contains from 1 to 3 halogen atoms independently selected from the group comprising chlorine and bromine, and wherein *n* is 1 to 3.

5. A polymeric composition comprising a polymer and a flame retarding amount of the flame retardant compound of claim 1 wherein said polymer is selected from polyurethane, polystyrene and acrylonitrile/butadiene/styrene terpolymers.

4,003,863
NOVEL INTUMESCENT COMPOSITION

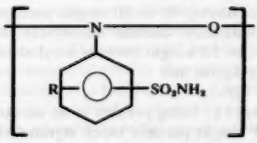
William S. Stoy, Princeton, and Shirley H. Roth, Highland Park, both of N.J., assignors to Cities Service Company, Tulsa, Okla.

Filed July 2, 1976, Ser. No. 702,153

Int. Cl.² C08J *9/02*

U.S. Cl. 260—2.5 FP **10 Claims**

1. A composition comprising (A) about 1-9 parts by weight of a water-insoluble amine-aldehyde copolymer having a number average molecular weight of about 350–2000 and consisting essentially of repeating units corresponding to the formula:



wherein Q is the residue of an alkanal containing 1–5 carbon atoms and R is hydrogen, alkyl, haloalkyl, alkoxy, haloalkoxy, halo, nitro, acetamido, or sulfonamido, (B) respectively, about 9–1 parts by weight of an epoxy resin which is polyglycidyl ether of an aliphatic or aromatic polyol, and (C) about 0.5–75%, based on the combined weights of the amine-aldehyde resin and the epoxy resin, of a polyol ester selected from the group consisting of polyacrylates and polymethacrylates.

4,003,864
INTUMESCENT COMPOSITION

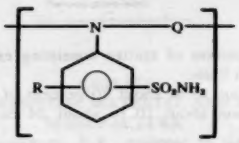
Shirley H. Roth, Highland Park, and William S. Stoy, Princeton, both of N.J., assignors to Cities Service Company, Tulsa, Okla.

Filed July 2, 1976, Ser. No. 702,152

Int. Cl.² C08J *9/02*

U.S. Cl. 260—2.5 FP **10 Claims**

1. An intumescent composition comprising (A) a water-insoluble amine-aldehyde copolymer having a number average molecular weight of about 350–2000 and consisting essentially of repeating units corresponding to the formula:



wherein Q is the residue of an alkanal containing 1–5 carbon atoms and R is hydrogen, alkyl, haloalkyl, alkoxy, haloalkoxy, halo, nitro, acetamido, or sulfonamido and (B) about 0.5–75%, based on the weight of the amine-aldehyde resin, of a polyol ester selected from the group consisting of polyacrylates and polymethacrylates.

4,003,865
ENZYME INHIBITORS, USES AND COMPOSITIONS CONTAINING SAME

Milton Nowak, South Orange, and William Singer, Teaneck, both of N.J., assignors to Troy Chemical Corporation, Newark, N.J.

Filed Feb. 2, 1973, Ser. No. 328,990

Int. Cl.² C08L *1/26*

U.S. Cl. 260—17 R **17 Claims**

1. An aqueous paint composition thickened to a viscosity of between 80 and 100 KU units by having incorporated therein at least one cellulosic thickening agent and stabilized against degradation of viscosity by enzyme action on said cellulosic thickening agent by having additionally incorporated therein approximately 0.05% to 2% based on the aqueous composition of at least one adduct of formaldehyde and an amine selected from the group consisting of primary amines and secondary amines, said adduct having the formula Q—N-H—CH_2OH if the amine is a primary amine, and QRN—CH_2OH if the amine is a secondary amine and wherein Q and R are selected from the group consisting of alkyl, alkoxy, substituted alkyl and substituted alkoxy groups and Q and R having no more than a total of ten carbon atoms.

4,003,866
CONSTRUCTION MATERIAL AND A PROCESS FOR PRODUCING THE SAME

Rene Paturle, St. Laurent-du-Pont, France, assignor to Etablissements Paturle S.A., St. Laurent-du-Pont, France

Filed Jan. 20, 1975, Ser. No. 542,254

Claims priority, application Germany, Jan. 22, 1974, 2402976; Sept. 17, 1974, 2444420

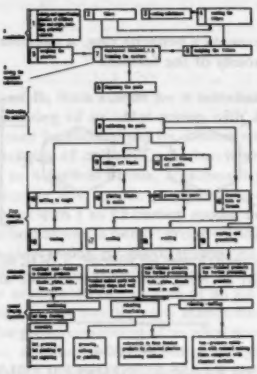
Int. Cl.² C08L *1/02*

U.S. Cl. 260—17.4 R **25 Claims**

1. A construction material which comprises a mixture of:

a. a plastic component constituting at least one thermoplastic resin; and

b. a filler component consitituting at least one mineral and/or organic filler in an amount at least equal in weight to the amount of said plastic component, the individual



particles of the filler being coated or encapsulated with a polyethylene or polypropylene wax having a molecular weight of from 1,000 to 10,000, a thermofluid high molecular weight polymer, or a silicate coating material.

4,003,867

GLASS MOLD COATING DISPERSION OF ALUMINUM PHOSPHATE AND RESINOUS AGENT, PIGMENT, STABILIZER AND DISPERSING AGENTS

Arthur William Cooper, and Thomas Edmund Rupp, both of Port Huron, Mich., assignors to Acheson Industries, Inc., Port Huron, Mich.

Filed June 12, 1974, Ser. No. 478,587

Int. Cl.² B28B *7/36;* **C03B** *39/00*

U.S. Cl. 260—17.5 **9 Claims**

1. A stable dispersion coating composition, suitable for use in forming a coating on surfaces which contact hot glass in the manufacture of glassware,

comprising in weight percent of total solids,

a. about 5% to about 45% of finely divided pigment from at least one of the group consisting of lubricating pigments, clay pigments, and refractory pigments,

b. about 1% to about 15% of a pigment dispersing agent to provide for proper dispersion of the pigment in the composition, said agent being selected from the group consisting of anionic surfactants of the non-foaming type,

c. about 20% to about 60% of aluminum phosphate as a binder material,

d. about 3% to about 20% of a stablizing/buffering agent to maintain a stable dispersion in the presence of the aluminum phosphate, selected from at least one of the group consisting of the ammonium and the alkali metal monobasic, dibasic, or tribasic salts of phosphoric, phosphorus, boric, phthalic, tartaric, and acetic acids,

e. about 1% to about 50% of an organic water dispersible resinous film-modifying agent for providing a fine smooth coating,

f. aout ½% to about 20% of a nonionic emulsifying agent for said film modifying agent.

and total solids being between about 2% to about 50% by weight of the composition, and the balance being an aqueous solvent carrier.

4,003,868

INK OR COATING COMPOSITIONS OF LOW VOLATILITY

Oliver Wendell Smith, South Charleston; Charles Hobert Carder, Charleston, both of W. Va., and David John Trecker, Old Lyme, Conn., assignors to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 205,855, Dec. 8, 1971, Pat. No. 3,935,330. This application Apr. 25, 1975, Ser. No. 571,786

Int. Cl.² C09D *3/52, 3/58, 3/81*

U.S. Cl. 260—21 **10 Claims**

1. A liquid or paste composition comprising:

I. — from 5 to 35 weight percent of a melamine/formaldehyde resin or urea/formaldehyde resin,

II.— from 40 to 90 weight percent of an acrylate or methacrylate ester of an epoxidized fatty oil, said ester having vicinal hydroxyl groups and an average of at least two acrylate or methacrylate groups per mole thereof,

III. — from 5 to 55 weight percent of a different hydroxyl-containing polyacrylate or polymethacrylate ester having an average of more than one functional acrylate or methacrylate group in the molecule,

IV. — a catalytic amount of a condensation catalyst sufficient to catalyze the condensation polymerization, and

V. — from 0 to 20 weight percent of a photoinitiator;

said liquid or paste composition having a viscosity of from W to greater than Z on the Gardner-Holdt Scale.

4,003,869

ETHYLENE-PROPYLENE COPOLYMER EMULSIONS

William E. Archibald, Marietta, Ga., assignor to Cosden Technology, Inc., Big Spring, Tex.

Filed Jan. 13, 1975, Ser. No. 540,317

Int. Cl.² C08L *23/08*

U.S. Cl. 260—29.6 XA **12 Claims**

1. A process for producing ethylene-propylene copolymer emulsions comprising contacting ethylene and propylene in a reaction zone in the presence of an aqueous medium containing minor amounts of a water-soluble alkali metal persulfate initiator and an emulsifier selected from anionic emulsifiers, nonionic emulsifiers, and mixtures thereof, at a temperature in the range of from about 75° C to about 150° C and at a pressure in the range of from about 1,500 psi to about 5,000 psi for a period of time sufficient to form said ethylene-propylene copolymer, the mole ratio of propylene to ethylene in said reaction zone being maintained in the range of from about 0.2:1 to about 1:1.

4,003,870

POLYMERIC THICKENERS

David Vincent Gibson, North Bayswater, and Bruce Leary, Frankston, both of Australia, assignors to Dulux Australia Ltd., Melbourne, Australia

Division of Ser. No. 520,897, Nov. 4, 1974, abandoned. This application July 17, 1975, Ser. No. 596,837

Claims priority, application Australia, Nov. 21, 1973, 5723/73

Int. Cl.² C08L *33/10, 33/12*

U.S. Cl. 260—29.6 RW **6 Claims**

1. A thickened aqueous latex paint comprising 0.1 to 15.0% by weight of latex solids of an amphipathic polymer in which the disperse particles of film-forming polymer of the latex have a diameter below 0.5 micron, characterised in that the amphipathic copolymer is essentially a copolymer of (a) poly-(ethylene glycol) acrylate or methacrylate and (b) methyl acrylate or methacrylate and which is further characterised in that:

1. the poly(ethylene glycol) must have a molecular weight of 500 – 1500, and

2. the weight balance of (a) to (b) is from about 0.7/1.0 to 0.5/1.0.

4,003,871

HIGH SOLIDS STYRENE-BUTADIENE EMULSIONS

John R. Costanza, North Plainfield, N.J., and Ellsworth E. Faust, Yardley, Pa., assignors to Celanese Corporation, New York, N.Y.

Filed Jan. 8, 1975, Ser. No. 539,470

Int. Cl.² C08L 47/00

U.S. Cl. 260—29.7 R 8 Claims

1. In a process for producing conjugated diene/monoethylenically unsaturated monomer-copolymer aqueous emulsions having solids contents in the range of 50–75 weight percent, wherein the monoethylenically unsaturated monomers contain a $CH_2=C<$ group from corresponding monomers by forming an aqueous monomer pre-emulsion by admixing at least one of the monomers with about 3 to about 50 percent, by weight, of water, based on the total weight of the monomers in the pre-emulsion, and a nonionic or anionic surfactant in an amount sufficient to emulsify said monomers, and the polymer subsequently formed therefrom, and adding the pre-emulsion to a polymerization reaction medium comprising free radical polymerization catalysts in initiating amounts in water, together with added free radical polymerization catalysts to complete the polymerization of the monomers and maintaining the rate of addition of the pre-emulsion at sufficient speed to maintain the addition polymerization, the improvement of which comprises utilizing as catalysts about 0.1 to about 2.0 percent, based on the total weight of the polymerizable monomers of a lypophilic initiator and about 0.01 to about 0.2 percent, based upon the total weight of the monomers of a hydrophilic initiator.

4,003,872

METAL-PIGMENTED PLASTIC POWDER AND PROCESS

Rolf Rolles; James E. Williams, Jr., both of New Kensington, and Thomas J. Kondis, Pittsburgh, all of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed July 19, 1973, Ser. No. 380,578

Int. Cl.² C08K 7/00

U.S. Cl. 260—37 EP 2 Claims

1. A process for producing a polished metal, plastic powder product, comprising brush polishing metal flake particles and plastic particles together, wherein the metal flake particles are aluminum and the plastic particles are based on thermosetting epoxy resin, have a specific gravity of 1.15 to 1.98, a melting point of 185° to 205° F, a time to gel of approximately 100 to 120 seconds at 360° F and volatiles of less than one weight-%.

4,003,873

CEMENT-PHENOLIC RESIN COMPOSITIONS

Harry A. Smith, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

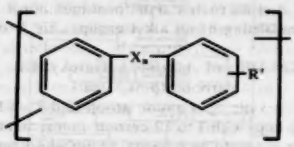
Continuation-in-part of Ser. No. 195,835, Nov. 4, 1971, abandoned. This application Nov. 16, 1972, Ser. No. 306,999

Int. Cl.² C08K 3/30

U.S. Cl. 260—38 3 Claims

1. An adhesive composition comprising a curable phenol-aldehyde resin and from about 20 to about 55 percent based on the weight of the resin of portland cement wherein the phenol reactant used in making said resin is phenol or a mixture of phenol with up to about 90 mole percent of a substituted phenol having at least two of the positions ortho and para to the phenolic hydroxyl group unsubstituted and capable of reaction with an aldehyde and wherein the resin is a methylolated novolac or a resole obtained by reacting said phenol with formaldehyde in the presence of an acidic or an essentially neutral condensation catalyst and wherein the said phenol-formaldehyde resole or methylolated novolac is the product of reaction of about 0.05–0.5 gram mole per 100 grams of resole or novolac of at least one aromatic amine of the group consisting of aniline, ar-(lower alkyl)aniline, lower alkoxyaniline, and a difunctional aromatic amine of the formula

wherein A represents a benzene ring, a naphthalene nucleus, or a dicyclic moiety of the formula



wherein X is oxygen, lower alkylidene, S, SO_2, or NH, n is zero or one, R is OH or NH_2, and R′ is H, lower alkyl, or lower alkoxy.

4,003,874

PRODUCING GLASS-REINFORCED POLYOLEFIN COMPOSITIONS

Fumio Ide, and Isao Sasaki, both of Ohtake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Aug. 30, 1972, Ser. No. 284,722

Claims priority, application Japan, Aug. 30, 1971, 46-66501; Oct. 21, 1971, 46-83512; Dec. 22, 1971, 46-104317

Int. Cl.² C08K 7/14

U.S. Cl. 260—42.18 24 Claims

1. In an extrusion process for providing a glass-reinforced polyolefin composite comprising the addition of an unsaturated carboxylic acid or anhydride thereof having 3 to 8 carbon atoms and 0.05 to 0.5 parts by weight of an organic peroxide to 100 parts by weight of a polyolefin, meltmixing the mixture in an extruder to form a modified polyolefin, and blending the resulting modified polyolefin with 5 to 200 parts by weight of a glass reinforcement, the improvement which comprises:

controlling the amount of the unsaturated carboxylic acid or anhydride thereof added within a range of 0.01 to 0.8 parts by weight, the unsaturated carboxylic acid or anhydried thereof serving as the essential agent to enhance adhesion and affinity of the polyolefin to the glass reinforcement.

4,003,875

ASYMMETRICAL OXALIC ACID DIARYL AMIDE STABILIZERS

Christian Lüthi, Basel; Max Dünnenberger, Frenkendorf, and Hans Rudolf Biland, Gelterkinden, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

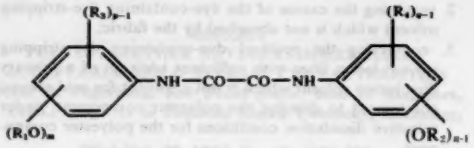
Continuation-in-part of Ser. No. 376,665, July 5, 1973, abandoned, which is a continuation-in-part of Ser. No. 253,070, May 15, 1972, abandoned, which is a continuation of Ser. No. 820,712, April 29, 1969, abandoned, which is a continuation-in-part of Ser. No. 614,039, Feb. 6, 1967, Pat. No. 3,529,982. This application Nov. 19, 1975, Ser. No. 633,200

Claims priority, application Switzerland, Feb. 7, 1966, 1680/66

Int. Cl.² C08K 5/25

U.S. Cl. 260—45.9 NC 12 Claims

1. A composition of matter substantially consisting of an organic material that can be damaged by ultraviolet rays, having incorporated therein an ultraviolet absorbing agent in a proportion sufficient to protect said material against the influence of ultraviolet rays, said ultraviolet absorbing agent being represented by an asymmetrical oxalic acid diarylamide of the formula



in which R_1 and R_2 each stands for a member selected from the group consisting of an alkyl group with 1 to 18 carbon atoms which may be substituted by a member selected from the group consisting of chlorine, a hydroxyl group, an alkoxy group with 1 to 4 carbon atoms, a carboxyl group, a nitrile group, a carboxylic acid amide group and a carboxylic acid alkyl ester groups with 1 to 12 carbon atoms, an alkenyl group with 3 to 4 carbon atoms, a benzyl group which may be substituted by chlorine atoms or alkyl groups, an aliphatic acyl group containing up to 18 carbon atoms and a benzoyl group which may be substituted by chlorine or an alkyl group with 1 to 4 carbon atoms; R_3 and R_4 each stands for a member selected from the group consisting of an alkyl group with 1 to 12 carbon atoms, a halogen atom, halogenalkyl group, a sulphonic acid group, a phenyl group and a phenylalkyl group whose alkyl residue contains 1 to 4 carbon atoms, or in each case two-ortho-positioned residues R_3 and/or R_4 together form a fused-on six-membered aromatic carbon ring, and m and n = 1 or 2 and p and q = 1, 2 or 3, each of the two ring systems containing apart from the bond via the —NH—group at most three substituents and the sum $m+(m-1) = 1$ or 2, and in other respects the substituents R_1O—, R_2O—, R_3 and R_4 being so constituted as to kind, number or positions that the molecule is asymmetrical.

4,003,876

SUPER COOLED M-PHENYLENE DIAMINE AS A CURING AGENT FOR EPOXY RESINS

Robert W. Warfield, Germantown; Thomas J. Wade, Takoma Park, and Porter W. Erickson, Silver Spring, all of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Continuation of Ser. No. 668,272, Aug. 7, 1967, abandoned, which is a division of Ser. No. 311,596, Sept. 25, 1963, abandoned. This application July 25, 1975, Ser. No. 599,297

Int. Cl.² C08G *59/50*

U.S. Cl. 260—47 EN **4 Claims**

1. A method of combining a curing agent with an epoxide resin consisting of:

a. heating normally solid nonadulterated m-phenylene diamine to a temperature above its melting point.

b. allowing said melted m-phenylene diamine to cool slowly to room temperature to form a stable supercooled liquid, and thereafter,

c. admixing said supercooled liquid with said epoxide resin.

4,003,877

PHOTOPOLYMERIZABLE SCREEN PRINTING INKS FOR PERMANENT COATINGS PREPARED FROM ARYLOXYALKYL COMPOSITIONS

Melvin A. Lipson, Fullerton; Dale W. Knoth, Norwalk; Walter D. Custer, Garden Grove, and Michael N. Gilano, Fullerton, all of Calif., assignors to Dynachem Corporation, Santa Ana, Calif.

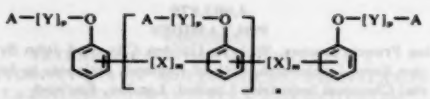
Filed May 24, 1974, Ser. No. 473,180

Int. Cl.² C09D *11/10*

U.S. Cl. 260—47 UA **9 Claims**

1. A photopolymerizable screen-printing ink which comprises:

A. 35–70% by weight of an aryloxyalkyl acrylate having the general formula:



wherein

X is a methylene, an alkyl-substituted methylene group, a dialkyl-substituted methylene group, a carbonyl group, a sulfide, a sulfoxide, a sulfone, an amine, an alkyl-substituted amine, an ethylene ether, a propylene ether, a 2-hydroxylpropylene ether, wherein each alkyl group contains from 1 to 8 carbon atoms;

Y is lower aklyl or hydroxylower alkyl of up to 8 carbon atoms;

A is an unsaturated acyloxy group having from 3 to 18 carbon atoms; and

n is 0 through 20,

m is 0 or 1,

p is 0 or 1;

B. 15–45% by weight of a photopolymerizable diluent having terminal ethylenic groups selected from

ethylene diacrylate; diethylene glycol diacrylate; tetraethylene glycol diacrylate; glycerol diacrylate; glycerol triacrylate; ethylene dimethacrylate; 1,3-propylene dimethacrylate; 1,2,4-butanetriol trimethacrylate; 1,4-benzenediol dimethacrylate; pentaerythritol tetremethacrylate; 1,3-propanediol diacrylate; 1,6-hexanediol diacrylate; the bis-acrylate of a polyethylene glycol having a molecular weight of 200 to 500; the bis-methacrylate of a polyethylene glycol having a molecular weight of 200 to 500; trimethylol-propane triacrylate; pentaerythritol triacrylate; methylene bis-acrylamide; methylene bis-methacrylamide; 1,6-hexamethylene bis-acrylamide; diethylene triamine tri-methacrylamide; bis-(methacrylamidopropoxy) ethane; bis-methacrylamidoethyl methacrylate N-(beta-hydroxyethyloxy) ethyl acrylamide; divinyl succinate; divinyl adipate; divinyl phthalate; divinyl terephthalate; divinyl benzene-1,3-disulfonate; divinyl butane-1,4-disulfonate; and sorbaldehyde;

C. 0.1–10% by weight of a free radical generating addition polymerizing initiating system;

said photopolymerizable composition having a viscosity of from 5,000 to 200,000 centipoises and a thixotropic index of from 1.00 to 6.00.

4,003,878

METHOD OF PREPARING AN ALKALI-METAL SALT OF AN ALKOXYSULFONATED BENZOIC ACID GLYCOL ESTER

Thomas F. Skaar, Wilmington, Del., and John A. Price, Swarthmore, Pa., assignors to Avtex Fibers Inc., Valley Forge, Pa.

Continuation of Ser. No. 313,140, Dec. 7, 1972, abandoned. This application Mar. 26, 1973, Ser. No. 345,230

Int. Cl.² C08G *63/68*

U.S. Cl. 260—49 **8 Claims**

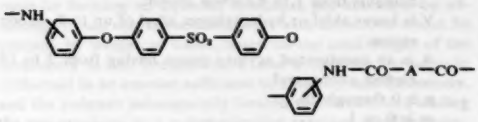
1. A method of preparing an alkali-metal salt of an alkoxysulfonated benzoic acid glycol ester which comprises reacting an alkyl ester of a meta- or para-hydroxy substituted benzoic acid wherein the alkyl group has from 1 to 6 carbon atoms with an alkali-metal alkoxide wherein the alkoxide group has from 1 to 4 carbon atoms and a solvent-reactant consisting essentially of an alkylene glycol having from 2 to 10 carbon atoms or diethylene glycol whereby a glycol ester of an alkali-metal oxy substituted benzoic acid is formed, and reacting said glycol ester with an alkane sultone having from 3 to 4 carbon atoms to form an alkali-metal salt of an alkoxy sulfonated benzoic acid glycol ester dissolved in said solvent-reactant glycol.

4,003,879
POLYAMIDES

Alan Francis Lennox, Welwyn Garden City, and John Brewster Rose, Letchworth, both of England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 259,606, June 5, 1972, abandoned.
This application Oct. 11, 1973, Ser. No. 405,260
Claims priority, application United Kingdom, June 7, 1971, 19190/71
Int. Cl.² C08G 69/40, 69/42
U.S. Cl. 260—49 5 Claims

1. A polyamide consisting essentially of repeating units having the structure

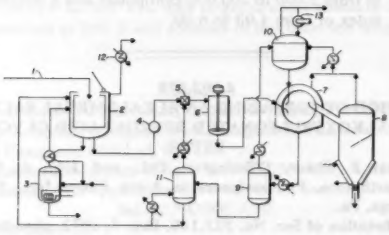


in which A is a bivalent aliphatic, cycloaliphatic or araliphatic radical containing at least 4 carbon atoms, said polyamide having improved resistance to opacity and curling on immersion in boiling water.

4,003,880
FABRIC DYE STRIPPING, SEPARATION AND RECOVERY OF POLYESTER

Norman C. Sidebotham, Decatur, Ala.; Paul D. Shoemaker, and Clarence W. Young, III, both of Pensacola, Fla., assignors to Monsanto Company, St. Louis, Mo.

Filed May 19, 1975, Ser. No. 578,592
Int. Cl.² C08G 63/70; D06M 9/00
U.S. Cl. 260—75 T 29 Claims



1. A process for separation, recovery and reuse in production, of polyester polymer from collections of fibers comprising a first polyester fiber component comprising polyester fibers selected from the group consisting of dyed fibers and undyed fibers and a second component consisting of fibers other than polyester fibers, said process comprising:

1. stripping the dye from said dyed polyester fibers by contacting the collections with a dye-stripping solvent for the first polyester fiber component at a temperature below which the polyester dissolves and above which the crystalline lattice of the polyester fibers swell so as to release the dye;
2. removing the excess of the dye-containing dye-stripping solvent which is not absorbed by the fabric;
3. contacting the residual dye-containing dye-stripping solvent-laden fiber with sufficient addition of a primary dissolution solvent which is not a solvent for said second component to dissolve the polyester component, under selective dissolution conditions for the polyester component
4. separating the dissolved polyester component from the undissolved second component; and
5. precipitating the polyester out of solution.

4,003,881
POLYESTER POLYMER RECOVERY FROM DYED POLYESTER FABRICS

Norman C. Sidebotham, Decatur, Ala.; Paul D. Shoemaker, and Clarence W. Young, III, both of Pensacola, Fla., assignors to Monsanto Company, St. Louis, Mo.

Filed Feb. 24, 1975, Ser. No. 552,839
Int. Cl.² D06M 9/00; C08G 63/70
U.S. Cl. 260—75 T 12 Claims

1. A process for recovery and reuse of dyed polyester fibers comprising stripping the dye from said fibers by:

1. contacting said fibers with a dye stripping solvent for said fibers at a temperature below which said fibers dissolve and above which the crystalline lattice of the polyester fibers swell so as to release the dye;
2. removing the excess of the dye-containing dye stripping solvent which is not absorbed by said fibers;
3. contacting the residual dye-containing dye stripping solvent-laden fibers with sufficient addition of a primary dissolution solvent under dissolution conditions for said fibers;
4. precipitating the polyester out of solution; and,
5. separating the precipitated polymer from the solvent.

4,003,882
POLYESTERETHER HAVING COMMERCIALLY ACCEPTABLE MOLD RELEASE CHARACTERISTICS

David R. Fagerburg, and Burns Davis, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 28, 1975, Ser. No. 626,517
Int. Cl.² C08G 63/12
U.S. Cl. 260—75 R 2 Claims

1. A composition comprising a polyesterether having an inherent viscosity of at least 0.4 comprised of

A. a dicarboxylic acid component comprised of terephthalic acid, and
B. a diol component comprised of
1. a glycol comprised of 95–75 mole percent 1,4-cyclohexanedimethanol and 5–25 mole percent ethylene glycol, and
2. 20–45 weight percent, based on the weight of the polyesterether, of a poly(alkylene oxide) glycol having 2 to 4 carbon atoms in the repeating unit and having a molecular weight in the range of 400 to 2,000.

4,003,883

POLYESTERETHER HAVING COMMERCIALLY ACCEPTABLE MOLD RELEASE CHARACTERISTICS

David R. Fagerburg, and Burns Davis, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 28, 1975, Ser. No. 626,518
Int. Cl.² C08G 63/12
U.S. Cl. 260—75 R 2 Claims

1. A composition comprising a polyesterether having an inherent viscosity of at least 0.4., comprised of

A. a dicarboxylic acid component comprised of terephthalic acid, and

B. a diol component comprised of

1. a glycol comprised of 90-60 mole percent 1,4-cyclohexanedimethanol and 10-40 mole percent tetramethylene glycol, and

2. 10–50 weight percent, based on the weight of the polyesterether, of a poly(alkylene oxide) glycol having 2 to 4 carbon atoms in the repeating unit and having a molecular weight in the range of 400 to 2,000.

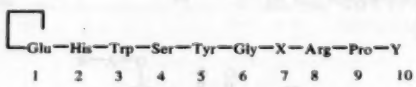
4,003,884

PEPTIDES HAVING LH-RH/FSH-RH ACTIVITY

Wolfgang König, Hofheim, Taunus; Rolf Geiger, and Jürgen K. Sandow, both of Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed May 16, 1975, Ser. No. 578,196
Claims priority, application Germany, May 18, 1974, 2424287; Dec. 20, 1974, 2460333; Dec. 20, 1974, 2460335
Int. Cl.² C07C 103/52; A61K 37/00
U.S. Cl. 260—112.5 LH 7 Claims

1. A peptide of the general formula



wherein X represents Ser(Bu^t), Cys(Bu^t), Asp(OBu^t), Glu (OBu^t), Orn(Boc) or Lys(Boc) and Y is glycinamide or a NH-alkyl group wherein the alkyl radical contains 1 to 3 carbon atoms and may be substituted by OH groups or halogen atoms, or Y is the NH-cyclopropyl radical and wherein Trp may be substituted by pentamethylphenyl alanine, Ser by Ala or Thr, Tyr by Phe, Gly by D-amino acids corresponding to the naturally occuring L-amino acids, Arg by Orn, Lys or homoarginine.

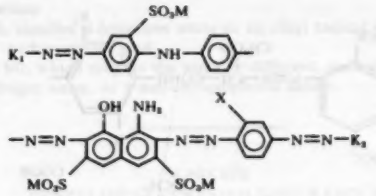
4,003,885

TETRAKISAZO COMPOUNDS HAVING A 1-HYDROXY-2-(4'-(2''-SULFOANILINO)PHENYLAZO)-3,6-DISULFO-7-(OPTIONALLY 2'-SUBSTITUTED PHENYLAZO)-8-AMINONAPHTHALENE MIDDLE COMPONENT

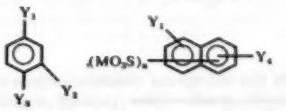
Claude Vogel, Saint-Louis, France, and Heinz Wicki, Basel, Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Filed July 2, 1974, Ser. No. 485,281
Claims priority, application Switzerland, July 9, 1973, 9953/73
Int. Cl.² C09B 31/30, 33/18, 35/36, 35/50
U.S. Cl. 260—166 22 Claims

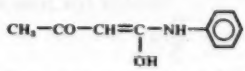
1. A dye of the formula



or a mixture thereof, wherein X is hydrogen, halo or —SO_3M, each of K_1 and K_2 is independently the radical of a coupling component of the formula



or



wherein

Y_1 is —OH or —NH_2,

Y_2 is —OH, —NH_2, anilino or toluidino,

Y_3 is hydrogen, —SO_3M or alkyl of 1 to 6 carbon atoms, with the proviso that when Y_3 is alkyl of 1 to 6 carbon atoms, Y_1 and Y_2 are —NH_2,

Y_4 is hydrogen, —OH, —NH_2, anilino, toluidino or acetamido, n is 0, 1 or 2, and each M is hydrogen or a non-chromophoric cation, wherein each halo is independently fluoro, chloro, bromo or iodo.

4,003,886
TETRACARBOXYLIC ACID ESTER SUBSTITUTED DISAZO PIGMENTS

Willy Müller, Riehen, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

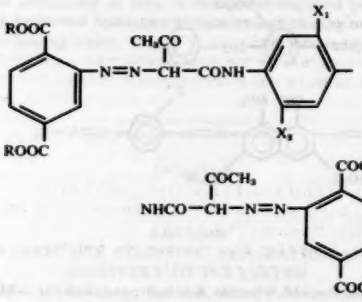
Continuation-in-part of Ser. No. 461,760, April 17, 1974, abandoned, which is a continuation-in-part of Ser. No. 178,839, Sept. 8, 1971, abandoned. This application May 13, 1976, Ser. No. 686,198

Claims priority, application Switzerland, Sept. 11, 1970, 13541/70

Int. Cl.² C09B 43/00

U.S. Cl. 260—176 3 Claims

1. A compound of the formula



in which X_1 and X_2 represent hydrogen, chlorine, bromine, methyl, methoxy, ethoxy or cyano and R represents methyl or ethyl, which has been subjected to an aftertreatment, said aftertreatment consisting of heating said compound in an inert organic liquid at a temperature of from 100° C to 150° C.

4,003,887
NOVEL PENICILLINS AND THEIR PREPARATION

Hisao Tobiki, Toyonaka; Hirotada Yamada; Iwao Nakatsuka, both of Nishinomiya; Kozo Shimago, Takarazuka; Shigeru Okano, Kawanishi; Takenari Nakagome, Nishinomiya; Toshiaki Komatsu, Takarazuka; Akio Izawa, Toyonaka; Hiroshi Noguchi, Takarazuka, and Yasuko Eda, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan

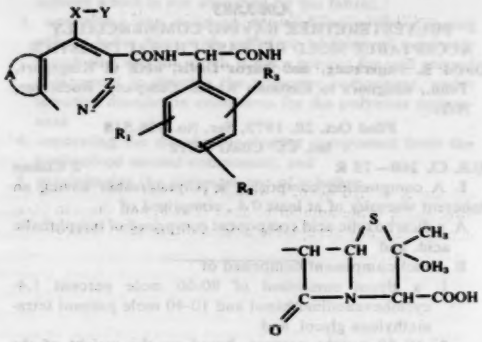
Division of Ser. No. 424,271, Dec. 13, 1973, Pat. No. 3,954,753. This application Sept. 3, 1975, Ser. No. 609,982

Claims priority, application Japan, Dec. 15, 1972, 47-126634

Int. Cl.² C07D 499/68

U.S. Cl. 260—239.1 13 Claims

1. A compound of the formula:



wherein Z is a nitrogen atom or a methylene group, the ring A is a benzene, pyrazole, thiazole, imidazole, pyrazine, pyridazine or pyrimidine ring when Z is a nitrogen atom or a methylene group, or a pyridine ring when Z is a nitrogen atom, the ring A being unsubstituted on being substituted with one on more substituents selected from the group consisting of lower alkyl, lower alkoxy, lower alkylthio, lower haloalkyl, lower alkylenedioxy, halogen, hydroxyl, nitro, amino, lower alkoxycarbonylamino, lower alkylamino, di(lower)alkylamino and lower alkanoylamino, R_1 is hydroxyl, lower alkanoxyloxy, lower alkoxycarbonyloxy or benzyloxycarbonyloxy, R_2 and R_3 are each hydrogen or halogen, X is oxygen or sulfur and Y is hydrogen, lower alkoxycarbonyl or lower alkanoyl, the Y-X-group being present on the carbon atom adjacent to the carbon atom to which the 6-(α-aminoacylamido)penicillanic acid moiety is linked, and non-toxic pharmaceutically acceptable salts thereof.

4,003,888
AMINOALKYL ETHERS OF 2- AND 3-HYDROXYBENZIL

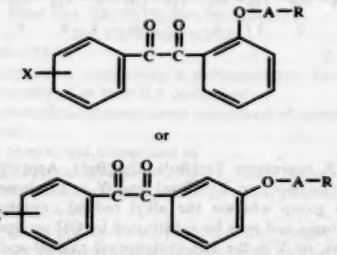
Michael W. Winkley, Malvern, and Gerhard R. Wendt, Havertown, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,488

Int. Cl.² C07D 295/08

U.S. Cl. 260—239 B 2 Claims

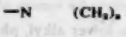
1. A compound of the formula:



or

wherein A is a divalent aliphatic hydrocarbon radical of the formula

and R is a substituted amino group of the formula



wherein X is hydrogen, lower alkyl, lower alkoxy, halo, or nitro; and *n* is the number 4, 5, 6, 7, or 8; and the non-toxic, pharmaceutically acceptable acid addition salts thereof.

4,003,889

1,3-DIARYL-2-PYRAZOLINE DERIVATIVES

Ivan Joseph Bolton, Bingley; Alec Victor Mercer, Leeds, both of England, and Fritz Fleck, Bottmingen, Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

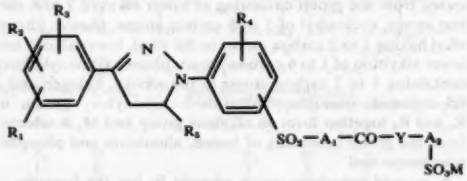
Filed June 17, 1974, Ser. No. 480,128

Claims priority, application United Kingdom, June 21, 1973, 29478/73; Nov. 16, 1973, 53255/73; Feb. 15, 1974, 6952/74

Int. Cl.² C07D *231/42*, *233/00*, *235/00*, *261/16*

U.S. Cl. 260—239.9 **30 Claims**

1. A compound of the formula,



in which either

R_1, R_2 and R_3, which may be the same or different, each signifies a hydrogen atom, a chloro or fluoro radical, an alkyl radical of 1 to 4 carbon atoms, an alkoxy radical of 1 to 4 carbon atoms, a cyano group, a group $-SO_3M$, an unsubstituted phenyl radical or a phenyl radical substituted by up to 2 substituents selected from chloro, fluoro, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms and the group $-SO_3M$, with the proviso that only one of R_1, R_2 and R_3 signifies an unsubstituted or substituted phenyl radical,

or two of

R_1, R_2 and R_3 together form a methylenedioxy group, the other of R_1, R_2 and R_3 having one of the above significances,

R_4 signifies a hydrogen atom, a chloro or fluoro radical, an alkyl radical of 1 to 4 carbon atoms or an alkoxy radical of 1 to 4 carbon atoms,

R_5 signifies a hydrogen atom, an alkyl radical of 1 to 4 carbon atoms, an unsubstituted phenyl radical or a phenyl radical substituted by 1 or 2 substituents selected from chloro, fluoro, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms and the group $-SO_3M$,

A_1 signifies a $C_1$to C_3 alkylene chain, unsubstituted or substituted by up to two alkyl groups of 1 to 4 carbon atoms,

A_2 signifies a C_1 to C_3 alkylene chain, unsubstituted or substituted by up to two alkyl groups of 1 to 4 carbon atoms; or a phenylene group, unsubstituted or substituted by up to 2 substituents selected from chloro, fluoro, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms and the group $-SO_3M$,

Y signifies —O— or $-NR_6-$,

in which

R_6 signifies a hydrogen atom or an alkyl radical of 1 to 4 carbon atoms, and

the Ms, which may be the same or different, each signifies a hydrogen atom, or a non-chromophoric cation.

4,003,890

BENZYLIDENE PYRANO (4,3-c)PYRAZOLES

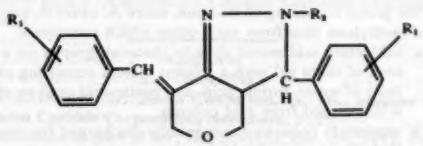
George C. Rovnyak, Hopewell, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed May 27, 1976, Ser. No. 690,702

Int. Cl.² C07D *491/06*, *405/12*

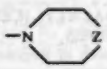
U.S. Cl. 260—240 F **6 Claims**

1. A compound having the formula



or a pharmaceutically acceptable salt thereof, wherein R_1 is hydrogen, hydroxy, alkyl, alkoxy, alkylthio, trifluoromethyl, halogen, nitro, cyano, dialkylamino or alkylsulfinyl; and R_2 is hydrogen, alkyl, aryl, arylalkyl,

wherein X is alkyl or aryl, or A-NR_3R_4 wherein A is a straight or branched chain alkylene group having 2 to 5 carbon atoms, R_3 is hydrogen or alkyl, and R_4 is hydrogen, alkyl, phenyl or phenylalkyl, or R_3 and R_4 together with the nitrogen atom to which they are attached are



wherein Z is CH_2, oxygen or N-R_5 wherein R_5 is hydrogen, alkyl, aryl or arylalkyl; wherein the terms alkyl and alkoxy refer to groups having 1 to 8 carbon atoms and the term aryl refers to phenyl or phenyl monosubstituted with an alkyl, alkoxy, halogen or trifluoromethyl group.

4,003,891
PREPARATION OF METAL COMPLEXES OF 6-METHOXY-1-PHENAZINOL 5,10-DIOXIDE

Joseph Donald Surmatis, West Caldwell, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 213,748, Dec. 29, 1971, abandoned, which is a continuation-in-part of Ser. No. 139,287, April 23, 1971, abandoned. This application Feb. 12, 1975, Ser. No. 549,414

Int. Cl.² C07D *241/52*

U.S. Cl. 260—242 **7 Claims**

1. A solid state reaction process for producing a complex of 6-methoxy-1-phenazinol 5,10-dioxide with a metal selected from the group consisting of calcium, strontium and magnesium which comprises reacting, in a water reaction medium, an agitated suspension of solid 6-methoxy-1-phenazinol 5,10-dioxide and a salt or hydroxide of said metal.

6. A process for producing a complex of 6-methoxy-1-phenazinol 5,10-dioxide with ferric chloride which comprises reacting ferric chloride hexahydrate with a solution of 6-methoxy-1-phenazinol 5,10-dioxide in a concentrated aqueous mineral acid selected from the group consisting of hydrochloric acid and sulfuric acid.

4,003,892
METHOD OF SEPARATING THIONINE AND ITS N-METHYL DERIVATIVES FROM EACH OTHER

Walter Löhr, Heuweiler; Norbert Grubhofer, Heidelberg; Inge Sohmer, Freiburg, and Dietrich Wittekind, Bad Krozingen, all of Germany, assignors to Serva-Entwicklungslabor v. Grothe & Co., Heidelberg, Germany

Filed Mar. 18, 1976, Ser. No. 668,051

Claims priority, application Germany, Apr. 17, 1975, 2516920

Int. Cl.² C07D *279/28*

U.S. Cl. 260—243 A **2 Claims**

1. A method of separating at least two mixed, cationic dyes of the group consisting of thionine, azure A, azure B, azure C, and methylene blue from each other which comprises:

a. subjecting said mixed dyes to chromatography on a column of silica gel with a solvent system consisting essentially of water, formic acid, and acetic acid until an eluate is discharged from said column;

b. separately collecting sequentially discharged fractions of said eluate, one of said fractions containing only one of the separated dyes, each dye being present in said fractions as the formate or acetate;

c. adsorbing the separated dye as the formate or acetate from said one fraction on an adsorbent substrate;

d. exposing the adsorbed dye to an aqueous sodium chloride solution until the dye is converted from the formate or acetate form to the chloride form; and

e. eluting the dye in the chloride form from said substrate with an organic solvent volatile in a vacuum at 37° C.

4,003,893
3-HETEROTHIO[(THIOALKYL)THIOACETYL]CEPHALOSPORANIC DERIVATIVES

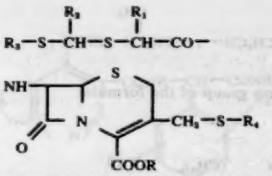
Hermann Breuer, and Uwe D. Treuner, both of Regensburg, Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Oct. 11, 1974, Ser. No. 513,978

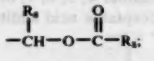
Int. Cl.² C07D *501/50*

U.S. Cl. 260—243 C **13 Claims**

1. A compound of the formula



wherein R is hydrogen, lower alkyl, phenyl-lower alkyl, benzhydryl, tri(lower alkyl)silyl, alkali metal, alkaline earth metal, triethylamine salt, (lower alkyl)amine salt or



R_1 is hydrogen, lower alkyl, phenyl, thienyl or furyl; R_2 and R_6 each is hydrogen or lower alkyl; R_3 and R_5 each is lower alkyl, phenyl or phenyl-lower alkyl; R_4 is oxadiazolyl, thiadiazolyl, thiatriazolyl, tetrazolyl, 1oxopyridinyl or their lower alkyl derivatives; said lower alkyl groups having up to eight carbon atoms.

4,003,894
PREPARATION OF 7-SUBSTITUTED AMINO-DESACETOXYCEPHALOSPORANIC ACID COMPOUNDS

Jan Verweij, Leiden; Hong Sheng Tan, Bleiswijk, and Hermanus Jacobus Kooreman, Delft, all of Netherlands, assignors to Gist-Brocades N.V., Delft, Netherlands

Continuation of Ser. No. 279,868, Aug. 11, 1972, abandoned. This application May 5, 1975, Ser. No. 574,365

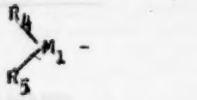
Claims priority, application United Kingdom, Aug. 17, 1971, 38637/71; Dec. 21, 1971, 59516/71

Int. Cl.² C07D *501/10*

U.S. Cl. 260—243 C **26 Claims**

1. A process for the preparation of 7β-acylamido-3-methyl-3-cephem-4-carboxylic acids by conversion of the corresponding 6β-acylamido penicillanic sulfoxide acids comprising heating a 6β-acylamidopenicillanic sulfoxide acid anhydride having the group $-COOR_3$, selected from the group consisting of

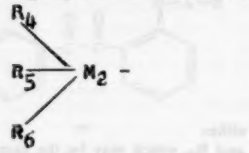
a. an acid anhydride group wherein R_3 is



V

wherein R_4 and R_5 are the same or different and each is selected from the group consisting of lower alkyl of 1 to 6 carbon atoms, cycloalkyl of 5 to 8 carbon atoms, phenyl, phenyl alkyl having 1 to 2 carbon atoms in the alkyl, lower alkoxy and lower alkylthio of 1 to 6 carbon atoms, phenoxy, phenylalkoxy containing 1 to 2 carbon atoms in the alkoxy, halogen and a 6β-acylamido-penicillanylsulfoxide-3-carbonyloxy group, or R_4 and R_5 together form an alkylene group and M_1 is selected from the group consisting of boron, aluminum and phosphorous atoms and

b. an acid anhydride group wherein R_3 has the formula

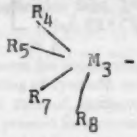


VI

wherein R_4, R_5 and R_6 are the same or different and each is selected from the group consisting of lower alkyl of 1 to 6 carbon atoms, cycloalkyl of 5 to 8 carbon atoms, phenyl, phenylalkyl having 1 to 2 carbon atoms in the alkyl, lower alkoxy of 1 to 6 carbon atoms, lower alkylthio of 1 to 6 carbon atoms, phenoxy, phenylalkoxy group having 1 to 2 carbon atoms in the alkoxy, halogen and a 6β-acylamidopenicillanyl

sulfoxide-3-carbonyloxy group or R_4 and R_5 together form an alkylene group or R_4 and R_5 or R_6 together are selected from the group consisting of =O and =S, and M_3 is selected from the group consisting of silicon, sulfur, germanium and tin atoms, or a carbon atom when R_4 and R_6 together are selected from the group consisting of =O and =S.

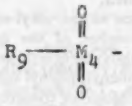
c. an acid anhydride group wherein R_3 has the formula



VII

wherein R_4 and R_5 are the same or different and have the above definition, and R_7 and R_8 are the same or different and are selected from the group consisting of halogen and a 6β-acylamido-penicillanyl sulfoxide-3-carbonyloxy group or R_7 and R_8 together form an alkylene group or together are selected from the group consisting of =S and =O, and M_3 is selected from the group consisting of phosphorous and tungsten atoms,

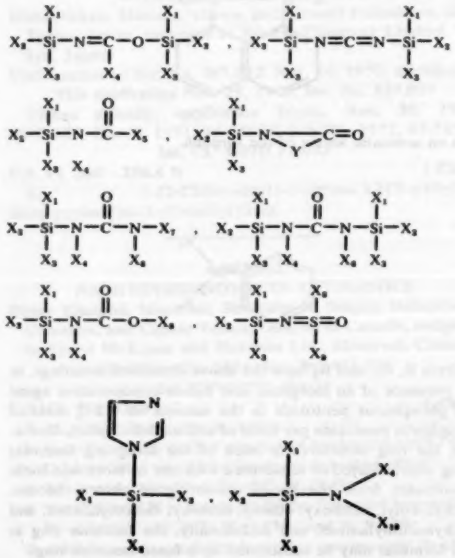
d. an acid anhydride group, wherein R_3 has the formula



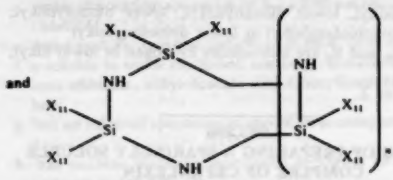
VIII

wherein R_9 is selected from the group consisting of lower alkyl of 1 to 6 carbon atoms, cycloalkyl of 5 to 8 carbon atoms, phenyl, phenylalkyl having 1 to 2 carbon atoms in the alkyl, lower alkoxy of 1 to 6 carbon atoms, lower alkylthio of 1 to 6 carbon atoms, phenoxy, or phenylalkoxy group having 1 to 2 carbon atoms in the alkoxy, and M_4 is a sulfur atom and

e. a group wherein R_3 is selected from the group consisting of an alkali metal, alkaline earth metal ion and a cation derived from an amine in a dry inert organic solvent at a temperature up to 160° C with an anhydrous acid capable of causing ring expansion of the penam ring to a Δ^3-cephem ring in the presence of at least one molar equivalent based on the compound of a silicon-containing compound having a formula selected from the group consisting of



and



wherein X_1, X_2 and X_3 are individually selected from the group consisting of halogen, lower alkyl of 1 to 6 carbon atoms, lower alkoxy of 1 to 6 carbon atoms, phenyl, phenylalkyl of 1 to 2 alkyl carbon atoms, cycloalkyl of 5 to 8 carbon atoms and when the X's are not halogen or alkyl, optionally substituted with a member of the group consisting of halogen, lower alkyl of 1 to 6 carbon atoms, lower alkoxy of 1 to 6 carbon atoms and di(lower)alkylamino of 1 to 6 carbon atoms, X_4, X_5, X_6 and X_7 are individually selected from the group consisting of hydrogen and hydrocarbon group of 1 to 8 carbon atoms, with no aliphatic unsaturation and X_6 and X_7 together with the nitrogen atom to which they are attached may form a 5- or 6-membered heterocyclic group which may contain a non-adjacent second hetero atom selected from oxygen and nitrogen, with the provisos that X_6 and X_7 together contain not more than 18 carbon atoms, and X_6 is alkyl with a tertiary carbon atom linked to the depicted nitrogen atom, X_7 is hydrogen, or X_4 and X_6 together with the nitrogen atoms to which they are attached and the carbonyl group complete a 5- or 6-membered heterocyclic group with an ethylene or tri-methylene group in the ring; X_8 and X_9 each are hydrocarbon of 1 to 8 carbon atoms, with no aliphatic unsaturation, X_{10} is selected from the group consisting of hydrogen, hydrocarbon of 1 to 8 carbon atoms with no aliphatic unsaturation and $-Si \equiv (X_1, X_2, X_3)$; X_{11} is alkyl of 1 to 8 carbon atoms; Y is alkylene of 3 to 18 carbon atoms with 3 to 5 carbon atoms between the nitrogen atom and the carbonyl group to which Y is attached; and n is 1 or 2, the aforesaid acid being strong enough not to be substantially silylated under the reaction conditions employed; and hydrolyzing the resulting compound in situ to form a 7β-acylamido-3-methyl-3-cephem-4-carboxylic acid.

4,003,895

1,4-THIAZINES

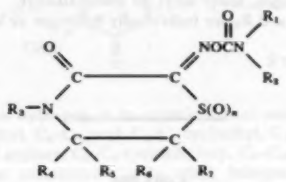
John A. Durden, Jr., South Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 319,532, Dec. 29, 1972, Pat. No. 3,894,150. This application Mar. 26, 1975, Ser. No. 562,130

Int. Cl.² C07D *279/12*

U.S. Cl. 260—243 R **11 Claims**

1. A compound having the structure:



wherein:

R_1 and R_2 are individually, hydrogen, lower alkyl, halo substituted lower alkyl, lower alkenyl, lower alkynyl, lower alkoxyalkyl, lower alkyl thioalkyl, lower trihaloalkanesulfenyl or lower alkanoyl, with the proviso that when R_1 is lower trihaloalkanesulfenyl or lower alkanoyl, R_2 is hydrogen or lower alkyl;

R_3 is lower cycloalkyl, lower dialkylamino, lower alkoxyalkyl, lower alkylthioalkyl, lower alkylcarbamoyl, carbamoyl, alkylsulfinylalkyl, alkylsulfonylalkyl, lower furylalkyl, lower tetrahydrofurylalkyl, lower thienylalkyl, lower

pyridylalkyl, lower dioxanylalkyl, lower oxazolylalkyl, lower oxathiolanylalkyl or lower dithiolanylalkyl

R_4, R_5, R_6, and R_7 are individually hydrogen or lower alkyl; and

n is 0, 1 or 2.

4,003,896

METHOD OF PREPARING A SPARINGLY SOLUBLE COMPLEX OF CEPHALEXIN

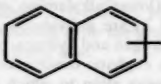
Peter Faarup, Frederiksberg, Denmark, assignor to Novo Industri A/S, Denmark

Filed Dec. 17, 1974, Ser. No. 533,624

Int. Cl.² C07D *501/12*

U.S. Cl. 260—243 C **7 Claims**

1. A method of preparing a sparingly soluble complex of cephalexin, comprising the step of reacting cephalexin with a compound having the formula:



wherein R is selected from the group consisting of hydrogen, hydroxy, chlorine, nitro, methyl, $-CH_2CN$ and $-COCH_3$.

4,003,897

CARBAMATE PESTICIDAL COMPOUNDS

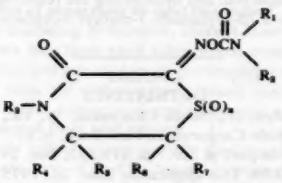
John Apling Durden, South Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 477,417, June 7, 1974, Pat. No. 3,930,002, which is a continuation-in-part of Ser. No. 319,532, Dec. 29, 1972, Pat. No. 3,894,150. This application Sept. 5, 1975, Ser. No. 610,680

Int. Cl.² C07D *279/12*

U.S. Cl. 260—243 R **13 Claims**

1. A compound of the formula:



wherein:

R_1 is lower trihaloalkanesulfenyl or lower alkanoyl;

R_2 is hydrogen or lower alkyl;

R_3 is hydrogen, lower alkyl, or lower alkenyl;

R_4, R_5, R_6 and R_7 are individually hydrogen or lower alkyl; and

n is 0, 1 or 2.

4,003,898

PROCESS FOR THE MANUFACTURE OF CATIONIC DYESTUFFS

Walter Gomm, Cologne, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

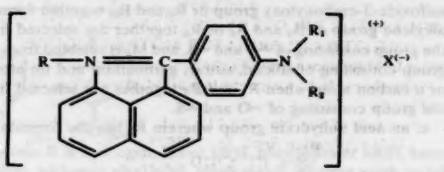
Filed Feb. 26, 1971, Ser. No. 119,393

Claims priority, application Germany, Mar. 6, 1970, 2010579

Int. Cl.² C07D *209/90, 413/06, 401/06, 401/10*

U.S. Cl. 260—247.1 L **6 Claims**

1. Process for the manufacture of cationic dyestuffs of the formula:



wherein

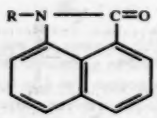
R is alkyl of 1-6 carbon atoms; alkyl of 1–6 carbon atoms substituted by a member of the group consisting of methoxy, ethoxy, methoxycarbonyl, ethoxycarbonyl, dimethylamidocarbonyl, diethylamidocarbonyl, piperidinyl, morpholinyl, chloro, cyano, dimethylamino and diethylamino; cyclohexyl; benzyl; β-phenylethyl; phenyl; phenyl substituted by methyl or methoxy; or trimethylene to form a ring structure attached to the carbon atom of the naphthalene ring adjacent to the carbon atom to which the nitrogen is attached;

R_1 is alkyl of 1–5 carbon atoms; alkyl of 1–5 carbon atoms substituted by a member of the group consisting of chloro, cyano, methoxycarbonyl and ethoxycarbonyl; cyclohexyl; benzyl; phenyl; phenyl substituted by methyl, methoxy, ethoxy or chloro; or trimethylene to form a ring structure when it is attached to the carbon atom of the phenyl ring adjacent to the carbon atom to which the nitrogen is attached;

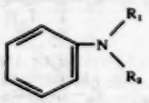
R_2 is alkyl of 1–5 atoms; alkyl of 1–5 carbon atoms substituted by a member of the group consisting of chloro, cyano, methoxycarbonyl and ethoxycarbonyl; cyclohexyl; benzyl; or trimethylene to form a ring structure when it is attached to the carbon atom of the phenyl ring adjacent to the carbon atom to which the nitrogen is attached;

X is an anion;

by condensation at a temperature of 20°–120° C. of a naphtholactam derivative of the formula:



with an aromatic amine of the formula:



wherein R, R_1, and R_2 have the above-described meanings, in the presence of an inorganic acid halide condensation agent and phosphorus pentoxide in the amount of 0.2–2 mols of phosphorus pentoxide per mole of said naphtholactam derivative; the ring structures in each of the foregoing formulas being unsubstituted or substituted with one or more non-ionic substituents from the group consisting of chloro, bromo, methyl, ethyl, methoxy, ethoxy, acetoxy, dimethylamino, and methylsulfonylamino, and additionally, the benzene ring in said formulas may be substituted by a fused benzene ring.

4,003,899
PROCESS FOR RECOVERY OF CYANURIC ACID FROM TREATED CHLORINATOR MOTHER LIQUOR

James L. Manganaro, New York, N.Y., and Ronald H. Carlson, Willingboro, N.J., assignors to FMC Corporation, Philadelphia, Pa.

Continuation of Ser. No. 443,112, Feb. 15, 1974, abandoned. This application Sept. 25, 1975, Ser. No. 616,556
Int. Cl.² C07D 251/32
U.S. Cl. 260—248 A 16 Claims

1. In a process for recovering cyanuric acid values from the group consisting of cyanuric acid and alkali metal salts thereof and mixtures thereof, isomers and salts, said cyanuric acid values being present in aqueous solution in an effluent mother liquor produced in the preparation of chlorinated isocyanuric acids and salts thereof, and from which mother liquor available free chlorine has been removed by acidification,

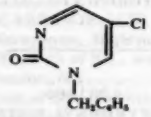
the improvement, comprising contacting said effluent mother liquor with aqueous solution of alkali metal cation selected from the group consisting of sodium and potassium, in amounts sufficient to effect precipitation of said cyanuric acid values as corresponding salt from said effluent mother liquor at a pH within the range of about 7 to about 11.

4,003,900
1-BENZYL-5-CHLORO-2-(1H)-PYRIMIDONE

Thomas J. Schwan, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Mar. 11, 1976, Ser. No. 666,024
Int. Cl.² C07D 239/22
U.S. Cl. 260—251 R 1 Claim

1. A compound of the formula:



4,003,901
NITROSOUREA DERIVATIVE

Hideo Nakao; Masao Arakawa, and Masami Fukushima, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

Continuation of Ser. No. 307,042, Nov. 16, 1972, abandoned. This application Nov. 25, 1974, Ser. No. 527,017
Claims priority, application Japan, Nov. 20, 1971, 46-93485; Dec. 4, 1971, 46-98034; July 26, 1972, 47-74782
Int. Cl.² C07D 239/42
U.S. Cl. 260—256.4 N 1 Claim

1. 1-(2-Chloroethyl)-1-nitroso-3-[(2-methyl-4-aminopyrimidine-5-yl)methyl]urea.

4,003,902
NAPHTHYRIDINOMYCIN ANTIBIOTICS

Dieter Kluepfel, Montreal; Surendra N. Sehgal, Dollard-des-Ormeaux, and Claude Vezina, Oka, all of Canada, assignors to Ayerst McKenna and Harrison Ltd., Montreal, Canada

Filed June 20, 1974, Ser. No. 481,291
Int. Cl.² C07D 498/22
U.S. Cl. 260—268 PC 1 Claim

1. Naphthyridinomycin A, which

a. is a ruby red crystalline compound having mp 108° – 110° C (dec) after crystallization from dry ethyl ether;

b. has a molecular formula of $C_{21}H_{27}N_5O_6$;

c. has C, H and N in substantially the following proportions by weight; C, 60.29%; H, 6.63%; and N, 9.93%;

d. exhibits a characteristic absorption maximum in its ultraviolet absorption spectrum of λ_{max} 270 nm, $E_{1cm}^{1\%}$ 248.5 (MeOH);

e. has a specific rotation $[\alpha]_D^{25}$ of + 69.4° (c = 1, $CHCl_3$);

f. is soluble in water methanol, acetone, chloroform, methylene chloride, ethyl acetate and ether; insoluble in hexane;

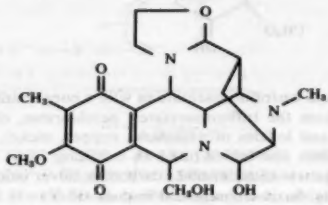
g. has an infrared spectrum as shown in accompanying FIG. 1;

h. has nuclear magnetic resonance spectrum as shown in accompanying FIG. 2;

i. has an Rf of about 0.66 on a thin layer plate of silica gel when using acetone-n-propanol-ethylene dichloride (6:2:3) as the mobile phase;

j. has an Rf of about 0.78 on a thin layer plate of alumina when using benzene-acetone-methanol (7:1.5:1.5) as the mobile phase; and

k. has the structural formula

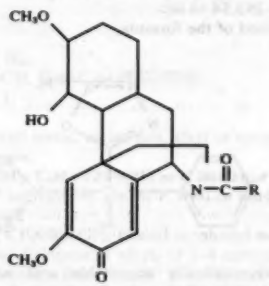


4,003,903
N-ACYL-N-NORSALUTARIDINES AND PROCESS FOR MAKING THEM

Martin Alan Schwartz, Tallahassee, Fla., assignor to Florida Board of Regents, Tallahassee, Fla.

Filed Feb. 12, 1975, Ser. No. 549,491
Int. Cl.² C07D 217/06
U.S. Cl. 260—285 19 Claims

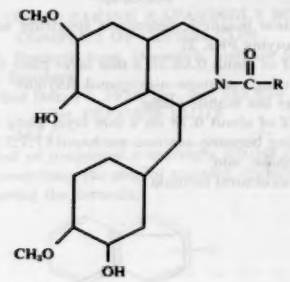
1. Process for synthesizing an N-acyl-N-norsalutaridine of the formula:



where R is hydrogen or an organic radical selected from C_1–C_{12} alkyl, C_6–C_{12} aryl, C_3–C_7 cycloalkyl, C_1–C_{12} alkoxy, C_6–C_{12} aryloxy, C_5–C_6 cycloalkyloxy, C_3–C_{12} alkenyloxy, halogen substituted C_1–C_{12} alkyl, halogen substituted C_6–C_{12} aryl, halogen substituted C_3–C_7 cycloalkyl, halogen substituted C_1–C_{12} alkoxy, halogen substituted C_6–C_{12} aryloxy, halogen substituted C_5–C_6 cycloalkoxy, halogen substituted C_3–C_{12} alkenyloxy, C_1–C_6 alkyl substituted with C_1–C_6 alkoxy or C_6–C_{12} aryl, C_1–C_6 alkoxy substituted with C_1–C_6 alkoxy or C_6–C_{12} aryl, C_6–C_{12} aryl substituted with 1-2 C_1–C_6 alkoxy radicals C_6–C_{12} aryloxy substituted on the aryl portion of said aryl radical with 1-2 C_1–C_6 alkoxy radicals, C_1–C_6 alkyl substituted with C_6–C_{12} aryl having 1–2 C_1–C_6 alkoxy radicals substituted on the aryl portion of said aryl radical and C_1–C_6 alkoxy substituted

with C_6–C_{12} aryl having 1–2 C_1–C_8 alkoxy radicals substituted on the aryl portion of said aryl radical, said halogen substituent being chlorine or fluorine and the number of substituents being from 1 to 7

which comprises reacting an N-acyl-N-norreticuline of the formula



with thallium tristrifluoroacetate or with a coordinating agent selected from the trifluoroacetates, perchlorates, chlorides, bromides and iodides of palladium, copper, nickel, magnesium, calcium and lithium, and an oxidizing agent selected from manganese dioxide, silver carbonate, silver oxide, vanadyl chloride, ferric chloride and lead dioxide.

4,003,904

ANTI-DIARRHEAL OXADIAZOLES

Gilbert W. Adelstein, Evanston, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Continuation-in-part of Ser. No. 456,755, April 1, 1974, Pat. No. 3,917,615. This application Apr. 16, 1975, Ser. No. 568,694

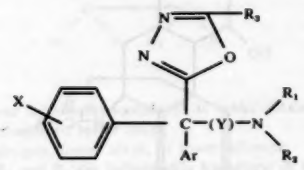
Claims priority, application South Africa, Feb. 26, 1975, 75/1193; Greece, Mar. 26, 1975, 6337

The portion of the term of this patent subsequent to Nov. 4, 1992, has been disclaimed.

Int. Cl.² C07D *85/54*

U.S. Cl. 260—293.54 **15 Claims**

1. A compound of the formula



and the pharmaceutically acceptable acid addition salts thereof wherein Y is alkylene having 1–4 carbon atoms; R_1 and R_2 together with N is a heterocyclic ring system consisting of an azamonocyclic ring of the formula

wherein Z is oxygen, methylene, phenylhydroxymethylene, phenylcarboxymethylene, phenylloweralkoxymethylene, or an azabicycloalkane structure having 6–9 carbon atoms and having at least 5 atoms in each ring of the azabicycloalkane structure; X is hydrogen, halogen, loweralkyl having 1–7 carbon atoms, or loweralkoxy having 1–7 carbon atoms; and Ar is phenyl, pyridyl, or monosubstituted phenyl wherein the substituent is halogen, loweralkyl having 1–7 carbon atoms, or loweralkoxy having 1–7 carbon atoms when R_3 is hydrogen, or Ar is 3 or 4 pyridyl when R_3 is lower alkyl having 1–7 carbon atoms.

4,003,905

DIELS-ALDER ADDUCTS OF BENZDIAZEPINES

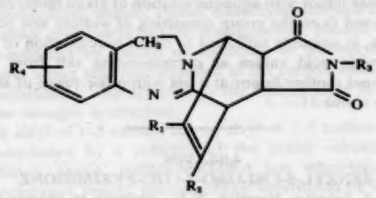
Harry L. Yale, New Brunswick, and James A. Bristol, Boonton, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Dec. 11, 1974, Ser. No. 531,512

Int. Cl.² C07D *471/18, 498/18, 513/18*

U.S. Cl. 260—293.55 **7 Claims**

1. A compound having the structure



wherein R_1 is hydrogen, halogen, alkyl, aryl or arylalkyl; R_2 is hydrogen, alkyl, aryl or arylalkyl; R_3 is hydrogen, alkyl, aryl or arylalkyl; and R_4 is hydrogen, halogen, alkyl, phenyl, dialkylamidosulfonyl or trifluoromethyl; and wherein alkyl and alkoxy refer to groups having 1 to 4 carbon atoms and aryl refers to phenyl or phenyl substituted with halogen, alkyl or alkoxy.

4,003,906

SUBSTITUTED PYRIDINYL METHYLTHIO OR (METHYLSULFONYL)BENZENEAMINES

Alin H. Gulbenk, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 435,608, Jan. 22, 1974, Pat. No. 3,931,200. This application Oct. 14, 1975, Ser. No. 622,195

Int. Cl.² C07D *213/34*

U.S. Cl. 260—294.8 F **6 Claims**

1. The compound which is 4-(((3,6-dichloro-2-pyridinyl)-methyl)thio)benzenamine.

4,003,907

Δ^1-1-AZACYCLOALKENE-2-CARBOXYLIC ACIDS AND THEIR PRODUCTION

Artur Botta, Krefeld, Germany, assignor to Bayer Aktiengesellschaft, Germany

Filed Nov. 27, 1974, Ser. No. 527,582

Claims priority, application Germany, Dec. 1, 1973, 2359990

Int. Cl.² C07D *207/02, 211/08, 223/04*

U.S. Cl. 260—295 R **13 Claims**

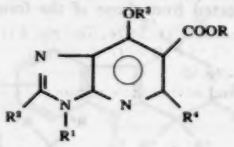
1. The process which comprises treating the lactam of a ω-amino-2,2-dihalocarboxylic acid, said lactam having from 6 to 8 lactam ring members, with at least two molar equivalents of a base selected from the group consisting of (a) an oxide, hydroxide or carbonate of lithium, sodium, potassium, magnesium, calcium, strontium or barium, (b) ammonium hydroxide and (c) a quaternary ammonium hydroxide at temperatures of from about 20° to about 180° C to produce a 1-azacycloalk-1-ene-2-carboxylic acid having one less ring member than said lactam.

4,003,908
DERIVATIVES OF IMIDAZO(4,5-b)PYRIDINES

Theodor Denzel, Regensburg, and Hans Hoehn, Tegernheim, both of Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Mar. 11, 1976, Ser. No. 665,754
Int. Cl.² C07D 213/55
U.S. Cl. 260—295.5 B 14 Claims

1. A compound of the formula



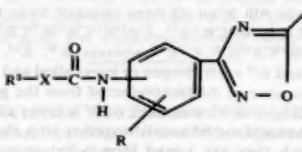
wherein
R is hydrogen or lower alkyl;
R^1 is hydrogen, lower alkyl, phenyl, phenyl-lower alkyl or cyclo-lower alkyl;
R^2 is hydrogen, lower alkyl, phenyl or phenyl-lower alkyl;
R^3 is lower alkyl or lower alkenyl;
R^4 is hydrogen, lower alkyl or phenyl; and physiologically acceptable salts thereof.

4,003,909
[(1,2,4-OXADIAZOL-3-YL)PHENYL]CARBAMIC OR THIOCARBAMIC ACID ESTERS

Venkatachala L. Narayanan, Hightstown, and Rudiger D. Haugwitz, Titusville, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 490,643, July 22, 1974, abandoned. This application Apr. 9, 1975, Ser. No. 566,595
Int. Cl.² C07D 271/06
U.S. Cl. 260—307 G 10 Claims

1. A compound of the formula



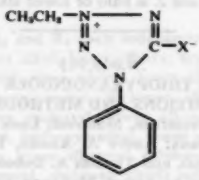
wherein X is oxygen or sulfur; R is selected from the group consisting of hydrogen, lower alkyl, phenyl, chloro, bromo, lower alkoxy, trifluoromethyl, phenoxy, and di(lower alkyl)-amino; R^1 is selected from the group consisting of hydrogen, lower alkyl, cycloalkyl of 3 to 6 carbons, phenyl, and substituted-phenyl; and R^2 is selected from the group consisting of lower alkyl, substituted-lower alkyl, lower alkenyl, lower alkynyl; cycloalkyl of 3 to 6 carbons, phenyl and substituted phenyl; said phenyl substituent being one or two members selected from the group consisting of fluoro, chloro, bromo, iodo, nitro, amino, trifluoromethyl, lower alkyl, and lower alkoxy or trimethoxy and said lower alkyl substituent being one or more members selected from the group consisting of chloro, bromo, fluoro and iodo; and the pharmaceutically acceptable salts thereof.

4,003,910
MESO-IONIC SE- AND S-CONTAINING TETRAZOLES

James R. Bartels-Keith, Lexington, and Mary T. Burgess, Boston, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Aug. 18, 1975, Ser. No. 605,401
Int. Cl.² C07D 257/04
U.S. Cl. 260—308 D 8 Claims

1. A compound of the formula



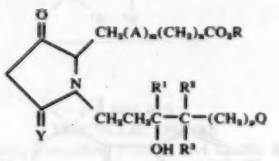
wherein X^- is $—S^-$ or $—Se^-$.

4,003,911
SELECTED 3-PYRROLIDINONES AND 2,4-PYRROLIDINDIONES

Richard Merrill Scribner, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 26, 1975, Ser. No. 617,054
Int. Cl.² C07D 207/24
U.S. Cl. 260—326.2 13 Claims

1. A compound of the formula



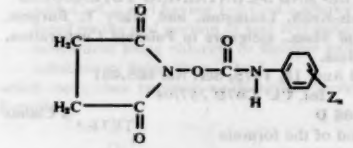
Y is O or H_2;
A is CH=CH, C≡C or phenylene;
m is 0 or 1;
n is 0–6;
R is H, alkali metal, amine salt, alkyl or cycloalkyl of up to 12 carbons;
R^1 is H, CH_3, C_2H_5, $CH=CH_2$ or C≡CH;
R^2 and R^3 individually are H, F, CH_3 or C_2H_5;
p is 0–6; and
Q is CH_3, CF_2CH_3, CF_3, phenyl or phenyl substituted with up to two halogens or alkyls of 1–4 carbons;
with the provisos that when R^1 is not H then R^2 and R^3 are each H; and
that when Q is phenyl or substituted phenyl *p* is 0–3.

4,003,912
DICARBOXIMIDO-N-PHENYLSUBSTITUTED CARBAMATES AND DERIVATIVES

John E. Franz, Crestwood, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation of Ser. No. 368,794, June 11, 1973, abandoned. This application Mar. 21, 1975, Ser. No. 561,013
Int. Cl.² C07D 207/46
U.S. Cl. 260—326.4 9 Claims

1. A compound of the formula



wherein *n* is 0–3 and Z is halo or lower alkoxy.

4,003,913

PYRANO- AND THIOPYRANOINDOLE DERIVATIVES, COMPOSITIONS AND METHODS OF USE

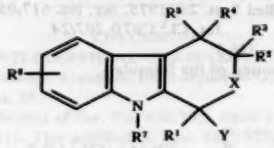
Christopher A. Demerson, Montreal; Lesie G. Humber, Dollard des Ormeaux; Andre A. Asselin, Lemoyne; Ivo Jirkovsky, Montreal, and Thomas A. Dobson, Roxboro, all of Calif., assignors to Ayerst McKenna and Harrison Ltd., Montreal, Canada

Continuation-in-part of Ser. No. 377,837, July 9, 1973, Pat. No. 3,880,853, and a continuation-in-part of Ser. No. 217,627, Jan. 13, 1972, Pat. No. 3,852,285. This application Mar. 5, 1975, Ser. No. 555,906

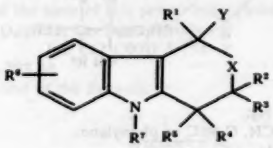
Int. Cl.² C07D *495/04*

U.S. Cl. 260—326.9 **26 Claims**

1. A compound selected from those of the formulae I and Ia



I

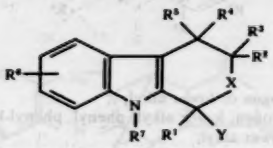


Ia

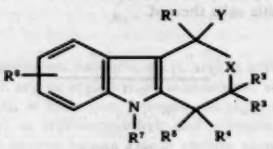
in which R^1 is lower alkyl or lower cycloalkyl; R^2, R^3, R^4 and R^5 are the same or different selected from the group consisting of hydrogen and lower alkyl; R^6 is hydrogen, lower alkyl, hydroxy, lower alkoxy, lower alkanoyloxy, nitro or halo; R^7 is hydrogen, lower alkyl, lower alkenyl, propargyl, phenyl(lower)alkyl or an amino(lower)alkyl radical of formula —Alk—NR^8R^9 wherein Alk is an alkylene selected from the group consisting of $CR^{10}R^{11}CR^{12}R^{13}$, $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}$ and $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}CR^{16}R^{17}$ wherein R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, R^{15}, R^{16} and R^{17} are hydrogen or lower alkyl, and R^8 and R^9 are either the same or different selected from the group consisting of hydrogen and lower alkyl, or R^8 is lower alkyl and R^9 is p-chlorophenacyl, or R^8 and R^9 together with the nitrogen atom to which they are joined form a heterocyclic amine radical selected from the group consisting of 1-pyrrolidinyl, piperidino, morpholino, 1-piperazinyl, 4-(lower alkyl)-1-piperazinyl and 4-[hydroxy(lower)alkyl]-1-piperazinyl; X is thio; and Y is lower alkyl, phenyl(lower)alkyl or an amino(lower)alkyl radical of fromula —Alk—NR^8R^9 wherein Alk is an alkylene selected from the group consisting of $CR^{10}R^{11}$, $CR^{10}R^{11}CR^{12}R^{13}$, $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}$ and $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}CR^{16}R^{17}$ wherein R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, R^{15}, R^{16} and R^{17} are hydrogen or lower alkyl and R^8 and R^9 are as defined herein; with the proviso that at least one of R^7 and Y is —Alk-NR^8R^9 and that in the compounds of formula 1*a*, Y is —Alk NR^8R^9 as defined herein; or a corresponding acid addition salt thereof with a pharmaceutically acceptable acid.

11. A method of relieving the symptoms of depression in warm blooded animals which comprises:

administering to said mammal an effective dose of from about 0.1 milligram to about 50 milligrams per kilogram of mammal weight per day of a compound selected from those of the formulae 1 and 1*a*



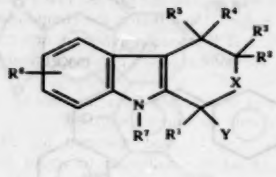
I



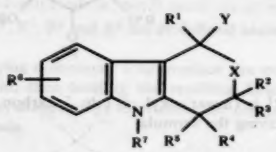
Ia

in which R^1 is lower alkyl or lower cycloalkyl; R^2, R^3, R^4 and R^5 are the same or different selected from the group consisting of hydrogen and lower alkyl; R^6 is hydrogen, lower alkyl, hydroxy, lower alkoxy, lower alkanoyloxy, nitro or halo; R^7 is hydrogen, lower alkyl, lower alkenyl, propargyl, phenyl(lower)alkyl or an amino(lower)alkyl radical of formula -Alk-NR^8R^9 wherein Alk is an alkylene selected from the group consisting of $CR^{10}R^{11}CR^{12}R^{13}$, $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}$, and $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}CR^{16}R^{17}$ wherein R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, R^{15}, R^{16} and R^{17} are hydrogen or lower alkyl and R^8 and R^9 are either the same or different selected from the group consisting of hydrogen and lower alkyl, or R^8 is lower alkyl and R^9 is p-chlorophenacyl, or R^8 and R^9 together with the nitrogen atom to which they are joined form a heterocyclic amine radical selected from the group consisting of 1-pyrrolidinyl, piperidino, morpholino, 1-piperazinyl, 4-(lower alkyl)-1-piperazinyl and 4-[hydroxy(lower)alkyl]-1-piperazinyl; X is thio; and Y is lower alkyl, phenyl(lower)alkyl or an amino(lower)alkyl radical of formula —Alk—NR^8R^9 is an alkylene selected from the group consisting of $CR^{10}R^{11}$, $CR^{10}R^{11}CR^{12}R^{13}$, $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}$ and $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}CR^{16}R^{17}$ wherein R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, R^{15}, R^{16} and R^{17} are hydrogen or lower alkyl and R^8 and R^9 are as defined herein; with the proviso that at least one of R^7 and Y is —Alk—NR^8R^9 and that in the compounds of formula 1*a*, Y is —Alk —NR^8R^9 as defined herein; and the corresponding acid addition salt with a pharmaceutically acceptable acid.

19. A pharmaceutical composition, which comprises: a compound selected from those of the formulae 1 and 1*a*



I



Ia

in which R^1 is lower alkyl or lower cycloalkyl; R^2, R^3, R^4 and R^5 are the same or different selected from the group consisting of hydrogen and lower alkyl; R^6 is hydrogen, lower alkyl, hydroxy, lower alkoxy, lower alkanoyloxy, nitro or halo; R^7 is hydrogen, lower alkyl, lower alkenyl, propargyl, phenyl(lower)alkyl or an amino(lower)alkyl radical of formula —Alk—NR^8R^9 wherein Alk is an alkylene selected from the group consisting of $CR^{10}R^{11}CR^{12}R^{13}$, $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}$ and $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}CR^{16}R^{17}$ wherein R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, R^{15}, R^{16} and R^{17} are hydrogen or lower alkyl, and R^8 and R^9 are either the same or different selected from the group consisting of hydrogen and lower alkyl, or R^8 is lower alkyl and R^9 is p-chlorophenacyl, or R^8 and R^9 together with the nitrogen atom to which they are joined form a heterocyclic amine radical selected from the group consisting of 1-pyrrolidinyl, piperidino, morpholino, 1-piperazinyl, 4-(lower alkyl)-1-piperazinyl and 4-[hydroxy(lower)alkyl]-1-piperazinyl; X is thio; and Y is lower alkyl, phenyl(lower)alkyl or an amino(lower)alkyl radical of formula —Alk—NR^8R^9 wherein Alk is an alkylene selected from the group consisting of $CR^{10}R^{11}$, $CR^{10}R^{11}CR^{12}R^{13}$, $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}$ and $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}CR^{16}R^{17}$ wherein R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, R^{15}, R^{16} and R^{17} are hydrogen or lower alkyl and R^8 and R^9 are as defined herein; with the proviso that at least one of R^7 and Y is —Alk—NR^8R^9 and that in the compounds of formula Ia, Y is —Alk—NR^8R^9 as defined herein; and the corresponding acid addition salt with a pharmaceutically acceptable acid; and a pharmaceutically acceptable carrier.

4,003,914

SULPHUR CONTAINING DERIVATIVES

Henri Ramuz, Birsfelden, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

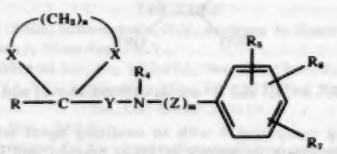
Filed Dec. 16, 1974, Ser. No. 532,990

Claims priority, application Switzerland, Dec. 21, 1973, 18030/73; Nov. 16, 1974, 15248/74

Int. Cl.² C07D *339/06*

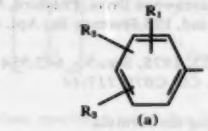
U.S. Cl. 260—327 M **15 Claims**

1. A compound of the formula



(I)

, wherein R is a group of the formula



(a)

in which R_1, R_2 and R_3 each independently is hydrogen, halogen, lower alkyl, lower alkoxy, aryl-(lower alkoxy), aryloxy, phenyl, nitro, amino, lower alkylthio, trifluoromethyl, hydroxy, cyano, di(lower alkyl)amino, lower alkanoylamino, carboxyl, lower alkoxycarbonyl, lower alkylsulphonyl, hydroxymethyl, lower alkanoyloxy, containing amido, lower alkanoyl, sulphamoyl, mono(lower alkyl)-sulphamoyl, di(lower alkyl) sulphamoyl, aminocarbonyloxy, mono(lower alkyl)-amino-carbonyloxy, di(lower alkyl)aminocarbonyloxy or (lower alkylamino)-(lower alkyl) in which "aryl" means unsubstituted or substituted phenyl. The substituent being selected from halogen, lower alkyl, lower alkoxy, nitro and amino; R_4 is hydrogen or lower alkyl; R_5, R_6 and R_7 each independently is hydrogen, halogen, lower alkyl, lower alkoxy, hydroxy or benzyloxy; X is a sulphur atom, SO or SO_2; Y is a straight-chain or branched-chain, aliphatic group which may be substituted with hydroxy and containing 2–8 carbon atoms, of which 2–4 carbon atoms are present in the chain; and Z is a straight-chain or branched-chain aliphatic group which may be substituted with hydroxy and contaning 1–8 carbon atoms, of which 1–4 carbon atoms are present in the chain;

m is zero or 1 and *n* is 2 or 3, and acid addition salts thereof.

4,003,915

TRICYCLIC IMINES

Philippe Dostert, Versailles, France, and Emilio Kyburz, Reinach, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

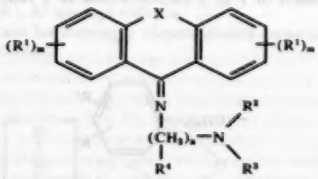
Division of Ser. No. 433,318, Jan. 14, 1974, Pat. No. 3,905,972, which is a division of Ser. No. 184,901, Sept. 29, 1971, Pat. No. 3,803,234. This application June 19, 1975, Ser. No. 588,268

Claims priority, application Switzerland, Oct. 9, 1970, 14972/70

Int. Cl.² C07D *337/12*

U.S. Cl. 260—327 B **3 Claims**

1. A compound of the formula



wherein X is thiomethylene; R^1 is hydrogen or lower alkyl; R^2 and R^3, individually, are hydrogen or lower alkyl; R^4 is hydrogen or lower alkyl; and *n* is an integer from 2 to 5; and *m* is an integer from 1 to 3,

or a pharmaceutically acceptable acid addition salt thereof.

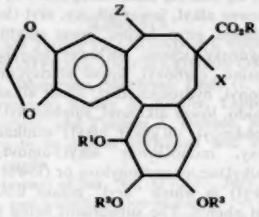
4,003,916

TOTAL SYNTHESIS OF STEGANACIN AND DERIVATIVES THEREOF

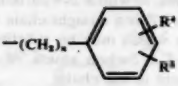
Andrew S. Kende, 19 Larchwood Drive, Pittsford, N.Y. 14534, and Lanny S. Liebeskind, 185 Freeman St., Apt. 446, Brookline, Mass. 02146

Filed Dec. 22, 1975, Ser. No. 642,954
Int. Cl.² C07D 317/44
U.S. Cl. 260—340.5 12 Claims

1. A compound having the formula

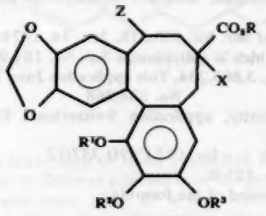


in which Z is H, hydroxy or oxo (=O), X is H or $-CO_2R$, R is H, (lower)alkyl of 1 to 5 carbon atoms, or a radical of the formula

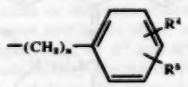


wherein *n* is an integer of 0 to 5 and R^4 and R^5 are alike or different and each is H, (lower)alkyl, Cl, Br, I, H, (lower)alkoxy, CF_3 or NO_2, and R^1, R^2 and R^3 are alike or different and each is H or (lower)alkyl of 1 to 3 carbon atoms; or a metallic or amine cationic salt thereof when R is H.

9. A process for the preaparation of the compound having the formula

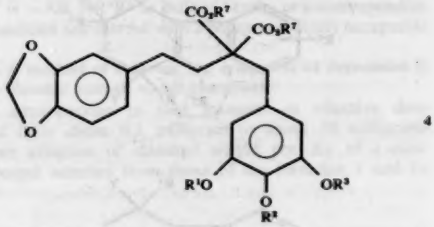


in which Z is H, hydroxy or oxo (=O), X is H or $-CO_2R$, R is H, (lower)alkyl of 1 to 5 carbon atoms or a radical of the formula



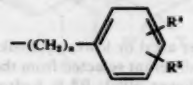
wherein *n* is an integer of 0 to 5 and R^4 and R^5 are alike or different and each is H, (lower)alkyl, Cl, Br, I, F, (lower)alkoxy, CF_3 or NO_2, and R^1, R^2 and R^3 are alike or different and each is H or (lower)alkyl of 1 to 3 carbon atoms, which process comprises the consecutive steps of

A. treating the compound having the formula

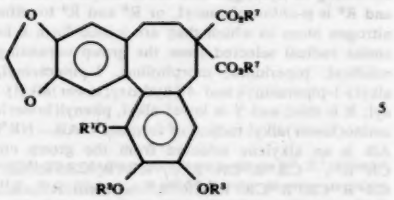


4

in which R^7 is (lower)alkyl of 1 to 5 carbon atoms or a radical having the formula



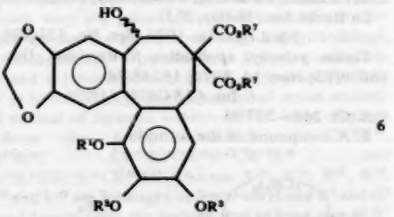
wherein *n* is an integer of 0 to 5 and R^4 and R^5 are alike or different and each is H, Cl, Br, I, (lower)alkoxy, CF_3 or NO_2, with an excess of VOF_3 or $VOCl_3$ in the presence of trifluoroacetic anhydride to produce the compound having the formula



5

in which R^7, R^1, R^2 and R^3 are as defined above; and when desired

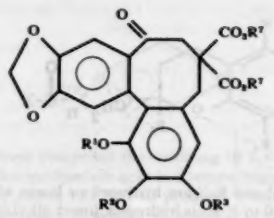
B. treating compound 5 with N-bromosuccinimide in the presence of a catalytic amount of benzoyl peroxide, followed sequentially by silver trifluoroacetate and weak base to produce the compound having the formula



6

in which R^7, R^1, R^2 and R^3 are as defined above; and when desired

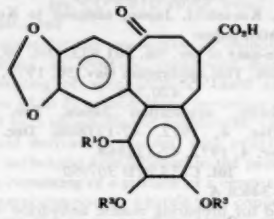
C. treating compound 6 with an oxidizing agent selected from the group consisting of Jones reagent and dipyridine-chromium trioxide to produce the compound having the formula



7

in which R^7, R^1, R^2 and R^3 are as defined above; and when desired

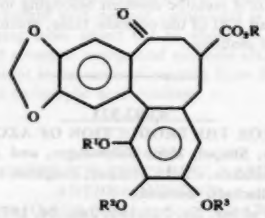
D. saponifying compound 7 to produce the corresponding ketodiacid, then heating the resulting ketodiacid until decarboxylation occurs to produce the compound having the formula



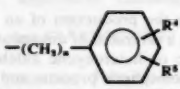
8a

in which R^1, R^2 and R^3 are as defined above; and when desired

E. esterifying compound 8a to produce the compound having the formula



in which R is (lower)alkyl of 1 to 5 carbon atoms or a radical having the formula



wherein n is an integer of 0 to 5 and R^4 and R^5 are alike or different and each is H, (lower)alkyl, Cl, Br, I, F, (lower)alkoxy, CF_3 or NO_2.

4,003,917

SILOXANEDIOLATE COMPLEXES AND PREPARATION THEREOF

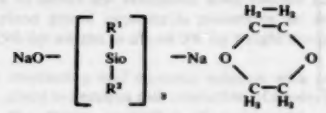
Terry G. Selin, Schenectady, N.Y., assignor to General Electric Company, Waterford, N.Y.

Division of Ser. No. 602,490, Dec. 19, 1966, Pat. No. 3,923,834. This application May 27, 1975, Ser. No. 581,146

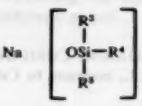
Int. Cl.² C07D 319/10

U.S. Cl. 260—340.6 7 Claims

1. A process for forming a siloxanediolate complex having the formula



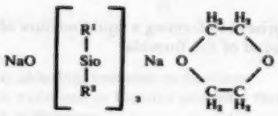
which comprises: reacting a metalsilanolate having the general formula



wherein R^3, R^4, and R^5 are hydrocarbyl radicals, with a cyclic polysiloxane having the general formula

in the presence of p-dioxane, where b is an integer of at least 3 and R^1, R^2 are aryl radicals.

6. A process for forming a siloxanediolate complex having the formula



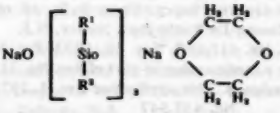
which comprises: reacting a metal alkoxide having the general formula

$NaOR^3$

wherein R^3 is a hydrocarbyl group, with a cyclic polysiloxane having the general formula

in the presence of p-dioxane, where b is an integer of at least 3, wherein R^1, R^2 are aryl radicals.

7. A process for forming a siloxanediolate complex having the formula



which comprises: reacting sodium hydroxide with a cyclic polysiloxane having the general formula

in the presence of p-dioxane, where *b* is an integer equal to at least 3, wherein R^1, R^2 are aryl radicals.

4,003,918

PRODUCTION OF 2-VINYL-1,3-DIOXANE COMPOUNDS

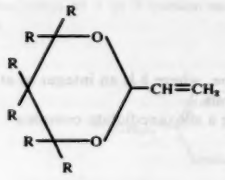
Oscar Richard Hughes, Chatham, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed Dec. 15, 1975, Ser. No. 640,618

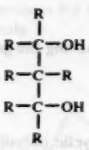
Int. Cl.² C07D *319/04*

U.S. Cl. 260—340.7 **9 Claims**

1. An improved process for producing 2-vinyl-1,3-dioxane compounds corresponding to the formula:



which process comprises (1) forming a liquid mixture of acrolein and diol compound of the formula:



wherein R is hydrogen or an alkyl group containing between one and about five carbon atoms, and (2) contacting the acroleindiol liquid mixture with solid perfluoro sulfonic acid cation exchange resin in acid form at a reaction temperature in the range between about −20° C and 100° C for a reaction period sufficient to achieve an equilibrium condensation between acrolein and diol compound.

4,003,919

ANTIOXIDANT CHROMAN COMPOUNDS

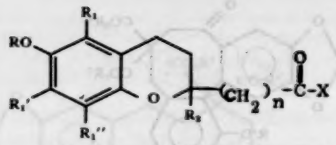
John William Scott, Upper Montclair; David Richard Parrish, Glen Ridge, and Gabriel Saucy, Essex Falls, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 417,465, Nov. 19, 1973, Pat. No. 3,947,473, which is a continuation-in-part of Ser. No. 317,566, Dec. 22, 1972, abandoned. This application Dec. 4, 1975, Ser. No. 637,547

Int. Cl.² C07D *311/72*

U.S. Cl. 260—345.5 **5 Claims**

1. A compound of the formula



wherein R_1, R_1' and R_1'' are hydrogen or lower alkyl; *n* is an integer from 0 to 1; R_2 is hydrogen, lower alkyl or phenyl; R is lower alkanoyl, benzoyl, benzyl, benzylhydryl or tetrahydropyranyl; and X is halogen.

4,003,920

METHOD FOR PRODUCING MALEIC ANHYDRIDE USING A PROMOTED TUNGSTEN, PHOSPHOROUS OXIDE CATALYST

Ryuhei Ueeda, Kurashiki, Japan, assignor to Kuraray Co., Ltd., Kurashiki, Japan

Continuation-in-part of Ser. No. 301,933, Oct. 30, 1972, Pat. No. 3,906,008. This application Nov. 30, 1973, Ser. No. 420,742

Claims priority, application Japan, Dec. 4, 1972, 47-121865; Dec. 4, 1972, 47-121866; Dec. 4, 1972, 47-121867; Dec. 4, 1972, 47-121868

Int. Cl.² C07D *307/60*

U.S. Cl. 260—346.8 A **10 Claims**

1. A method for preparing maleic anhydride which comprises oxidizing in the vapor phase an unsaturated hydrocarbon selected from the group consisting of butene-1, butene-2, butadiene, cyclopentadiene, pentene-1, mixtures thereof and C_4-fractions obtained by naphtha cracking in a reaction zone at a temperature of from 250° to 650° C, in the presence of a catalyst consisting essentially of the oxides of tungsten and phosphorous of a metallic element belonging to groups III-A, III-B, IV-A and VIII of the periodic table, arsenic, zirconium, antimony and niobium.

4,003,921

PROCESS FOR THE PRODUCTION OF AZOMETHINES

Werner Kluy, Stiepel; Hans Feichtinger, and Jurgen Falbe, both of Dinslaken, all of Germany, assignors to Ruhrchemie Aktiengesellschaft, Germany

Continuation of Ser. No. 326,181, Jan. 24, 1973, abandoned. This application May 1, 1975, Ser. No. 573,729

Claims priority, application Germany, Jan. 24, 1973, 2205791

Int. Cl.² C07C *119/00*

U.S. Cl. 260—347.7 **14 Claims**

1. A process for the production of an azomethine, which comprises reacting a saturated or unsaturated aliphatic, cycloaliphatic, aromatic or heterocyclic aldehyde with ammonia and hydrogen at atomspheric pressure and at a temperature of 20° to 200° C in the presence of a catalyst containing at least one metal of group VIII B of the periodic table.

4,003,922

SYNTHESIS OF CIS-1,4-CYCLOHEXADIENE DIOXIDE

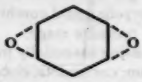
Gerry Kavadias, St-Lambert, and Bernard Belleau, Westmount, both of Canada, assignors to Bristol-Myers Company, New York, N.Y.

Division of Ser. No. 634,396, Nov. 24, 1975. This application Feb. 10, 1976, Ser. No. 656,919

Int. Cl.² C07D *301/14*

U.S. Cl. 260—348.5 L **3 Claims**

1. A process for the preparation of the compound having the formula



which process comprises the oxidizing of 1,4-cyclohexadiene with m-chloroperbenzoic acid in a temperature range of about −10° C. to about +35 ° C to produce a mixture of cis-and trans- bisepoxides in a ratio of about 2:1, respectively, and separating the cisbisepoxide from the mixture.

4,003,923

PREPARATION OF QUINONES

Paul R. Stapp, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 19, 1975, Ser. No. 551,128

Int. Cl.² C07C *49/68, 49/62*

U.S. Cl. 260—369 **5 Claims**

1. A process for the production of quinones which comprises reacting an aromatic compound selected from the group consisting of acenaphthene, fused ring compounds having from 14 to 22 carbon atoms per molecule and containing from 3 to 5 six-membered carbocyclic rings, and monosulfonic acid derivatives thereof, with oxygen in the liquid phase in a carboxylic acid medium in the presence of a catalyst system consisting of a mixture of a copper compound and an alkali metal compound, wherein said copper compound is selected from the group consisting of the carboxylates, halides, oxides and carbonates thereof, and wherein said alkali metal compound is selected from the group consisting of the halides, carboxylates and oxides thereof, said reaction being carried out at a temperature in the range of from 30° to about 200° C and a pressure in the range of from 0.1 to about 750 psig of oxygen above autogenous pressure at the temperature employed, wherein said copper compound is present in an amount ranging from about 0.1 to about 50 mole percent based on said aromatic compound and said alkali metal compound is present in an amount ranging from 0.1 to 2 molar based on said carboxylic acid medium.

4,003,924

PROCESS FOR PREPARING 1-AMINO ANTHRAQUINONE

Wolfgang Auge, Odenthal-Hahnenberg; Karl-Werner Thiem, Cologne; Rutger Neeff, Leverkusen; Paul Losacker, Leichlingen, and Rudolf Braden, Odenthal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 3, 1975, Ser. No. 546,833

Claims priority, application Germany, Mar. 5, 1974, 2410310

Int. Cl.² C07C *97/24*

U.S. Cl. 260—382 **13 Claims**

1. Process for preparing 1-amino-anthraquinone which comprises treating a reaction mixture containing 1-amino-anthraquinone imine, after substantially or completely removing ammonia therefrom, with water thereby converting said 1-amino-anthraquinone imine into 1-amino-anthraquinone.

4,003,925

PURIFICATION OF SODIUM ISETHIONATE

Vincent Lamberti, Upper Saddle River, and Beth Ann Di Lorenzo, Ridgewood, both of N.J., assignors to Lever Brothers Company, New York, N.Y.

Continuation-in-part of Ser. No. 456,576, April 1, 1974, abandoned. This application June 12, 1975, Ser. No. 586,323

Int. Cl.² C07C *143/10*

U.S. Cl. 260—513 R **6 Claims**

1. A process for the extraction of ethylene glycol impurity from an aqueous solution of sodium isethionate having dissolved therein said sodium isethionate in an amount of about 40% to about the saturation level thereof and wherein said ethylene glycol impurity is present in an amount of about 0.05% by weight to about 3% by weight comprising the steps of:

i. contacting said aqueous solution with an amount sufficient to result in said extraction of a solvent selected from the group consisting of n-propanol, isopropanol, 2-butanol, isobutanol, n-butanol and mixtures thereof at a temperature of about 15° C to a temperature of about 10° C below the boiling point of the solvent selected, wherein a solvent phase and an aqueous phase are formed, and

ii. removing the solvent phase containing the extracted ethylene glycol.

4,003,926

HERBICIDAL 2-ARYLAMINOCARBONYL-1-CYCLOHEXENE-1-CARBOXYLIC ACIDS AND SALTS THEREOF

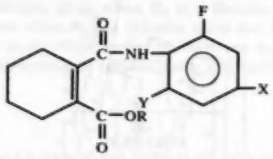
Steven Jerome Goddard, West Grove, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 30, 1975, Ser. No. 545,602

Int. Cl.² C07C *63/12*

U.S. Cl. 260—518 A **4 Claims**

1. A compound of the formula



wherein

X is chlorine, bromine or fluorine;

Y is hydrogen or fluorine provided that when Y is fluorine, X is fluorine;

R is hydrogen or a cation selected from sodium, lithium, potassium, calcium, magnesium, zinc, manganese, barium or

wherein

R_1, and R_2, and R_3 can be the same or different and each can be hydrogen alkyl of 1 through 4 carbon atoms or hydroxyalkyl of 2 through 4 carbon atoms;

R_4 is hydrogen, alkyl of 1 through 12 carbon atoms, benzyl, or NR_5R_6 where R_5 is hydrogen or alkyl of 1–4 carbon atoms and R_6 is hydrogen or alkyl of 1 through 4 carbon atoms.

4,003,927

(1-OXO-7,8-DISUBSTITUTED-1,2,3,4-TETRAHYDRO-6-NAPHTHYLOXY)- AND (3,4-DISUBSTITUTED-5-OXO-6,7,8,9-TETRAHYDRO-5H-BENZOCYCLOHEPTENE-2-YLOXY) ACETIC ACIDS AND DERIVATIVES

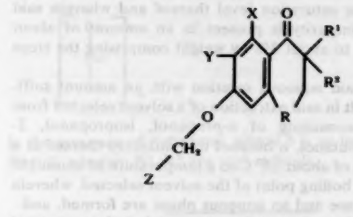
Otto W. Woltersdorf, Jr., Chalfont; Edward J. Cragoe, Jr., Lansdale; Everett M. Schultz, Ambler, and Gerald E. Stokker, Gwynedd Valley, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Oct. 12, 1973, Ser. No. 405,980

Int. Cl.² C07C *63/595*

U.S. Cl. 260—520 D **1 Claim**

1. A compound of the formula:



wherein R is methylene; R^1 is cyclopentyl; R^2 is C_1 to C_4 alkyl or hydrogen; X and Y are independently halogen or methyl; and Z is carboxy or a carboxylate salt of physiologically acceptable non-toxic cations.

4,003,928

PROCESS FOR THE PREPARATION OF UREA

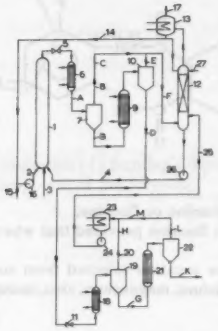
Antonius M. A. Heunks, Geleen, Netherlands, assignor to Stamicarbon N.V., Geleen, Netherlands

Continuation of Ser. No. 222,274, Jan. 31, 1972, abandoned. This application June 24, 1974, Ser. No. 482,763

Claims priority, application Netherlands, Feb. 3, 1971, 7101398

Int. Cl.² C07C *126/00*

U.S. Cl. 260—555 A **4 Claims**



1. In a process for the preparation of urea having at least three successively lower pressure stages comprising:

a urea-synthesis pressure stage wherein ammonia and carbon dioxide together with recycled ammonium carbamate are fed into a urea-synthesis reactor in an overall ammonia to carbon dioxide ratio of 3–5 to 1 and reacted at a pressure of at least 160 atmos. absolute and at a temperature of at least 160° C thereby forming an aqueous urea solution, said aqueous urea solution also containing ammonium carbamate and excess ammonia; and

at least two ammonium carbamate decomposition pressure stages wherein the aqueous urea solution from the next higher pressure stage is reduced in ammonium carbamate and excess ammonia content, each of such ammonium carbamate decomposition pressure stages having the process steps including:

the adiabatic expansion of said aqueous urea solution from the next higher pressure stage thereby decomposing ammonium carbamate,

a first separation wherein the expanded aqueous urea solution is separated into a first off-gas stream and a residual aqueous urea solution,

heating said residual aqueous urea solution thereby further decomposing ammonium carbamate,

a second separation wherein said heated residual aqueous urea solution is separated into a second off-gas stream and an aqueous urea solution reduced in ammonium carbamate content,

combining said first and said second off-gas streams into a combined off-gas stream, and

condensing and recycling said combined off-gas stream to the next higher pressure stage,

the improvement consisting essentially in including in at least one of said ammonium carbamate decomposition pressure stages, the step of preliminary heating of said expanded aqueous urea solution prior to said first separation, so as to increase the temperature of said expanded aqueous urea solution to no more than 20° C above the temperature of said expanded aqueous urea solution, said temperature increase further constituting no more than 40% of the total temperature increase in said at least one of said ammonium decomposition pressure stages subsequent to said expansion.

4,003,929

ANTIVIRAL SUBSTITUTED PHENYLENEDIMETHYLENE DIAMINES

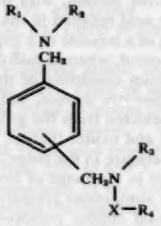
Kenneth Richardson, Canterbury, England, assignor to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 543,824, March 11, 1975, abandoned. This application Sept. 10, 1975, Ser. No. 611,856

Int. Cl.² C07C *143/74, 143/75;* A61K *31/18*

U.S. Cl. 260—556 A **5 Claims**

1. A compound of the structure

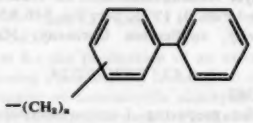


and its acid addition salts;

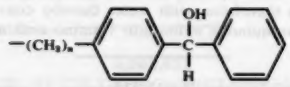
R_1 is selected from the group consisting of hydrogen, methyl and 2-hydroxyethyl;

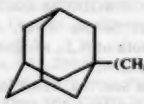
R_2 is selected from the group consisting of hydrogen, lower alkyl having 1 to 6 carbon atoms and ω-hydroxyalkyl having 1 to 6 carbon atoms;

R_3 is selected from the group consisting of alkyl having from 12 to 24 carbons, a monovalent aliphatic non-cyclic hydrocarbon having from 12 to 24 carbon atoms and 1 to 2 double bonds therein,



and





wherein

n is an integer from one to six;

X is

and R_4 is selected from the group consisting of alkyl having from 12 to 24 carbon atoms, a monovalent noncyclic aliphatic hydrocarbon having from 12 to 24 carbon atoms and 1 to 2 double bonds therein, ω-hydroxyalkyl having 1 to 6 carbon atoms and phenylalkyl having up to three carbon atoms in the alkyl moiety.

4,003,930

2,3-TRANS-5-[3-(AMINO)-2-HYDROXY-PROPOXY]-1,2,3,4-TETRAHYDRO-3-(OR 2)-AMINO-2-(OR 3)-HYDROXY-NAPHTHALENES AND SALTS THEREOF

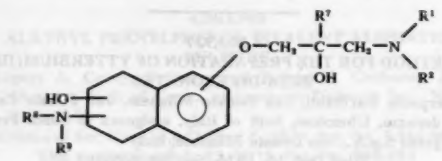
Frederic P. Hauck, Somerville; Christopher M. Cimarusti, Hamilton, both of N.J., and Joseph E. Sundeen, Yardley, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 268,301, July 3, 1972, abandoned. This application Feb. 28, 1974, Ser. No. 446,859

Int. Cl.² C07C *93/06*

U.S. Cl. 260—570.7 **9 Claims**

1. A compound having the structure



or a pharmaceutically acceptable salt thereof, wherein R^1, R^2, R^8 and R^9 are each independently selected from the group consisting of hydrogen, lower alkyl, and aryl-lower alkyl and R^7 is selected from the group consisting of hydrogen and methyl, and wherein lower alkyl refers to alkyl groups having up to 8 carbon atoms and aryl refers to phenyl or phenyl substituted with lower alkyl, halogen or nitro.

4,003,931

DERIVATIVES OF ALPHA-METHYL BENZYLAMINE

Michèle Moreau; Isaac Karadavidoff, both of Paris, and Claude Rissé, Saint-Michel-sur-Orge, all of France, assignors to Fuveau S.A., Paris, France

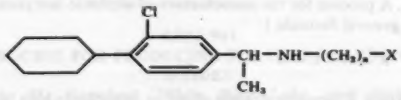
Filed Oct. 27, 1971, Ser. No. 193,175

Claims priority, application France, Oct. 28, 1970, 70.38818; July 15, 1971, 71.25902

Int. Cl.² C07C *87/28*

U.S. Cl. 260—570.5 P **5 Claims**

1. Compounds of formula:



in which X is hydrogen, halogen or an amine group of the formula

in which R_1 and R_2 are each hydrogen or a lower alkyl group, n is equal to 1, 2, or 3 and may equal 0 when X is hydrogen and their addition salts of pharmaceutically acceptable acids.

4,003,932

AMINOALKYLETHERS

Johan Gootjes, Heerhugowaard, Netherlands, assignor to Gist-Brocades N.V., Netherlands

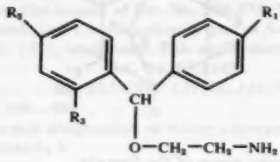
Filed Mar. 6, 1973, Ser. No. 338,621

Claims priority, application United Kingdom, Mar. 7, 1972, 10543/72

Int. Cl.² C07C *93/06*

U.S. Cl. 260—570 R **5 Claims**

1. Diphenylmethoxyethylamines of the general formula



II

in which R_1 represents a fluoride, bromine or chlorine atom, R_2 represents a hydrogen or fluorine atom; and R_3 represents a hydrogen, fluorine or chlorine atom; with the provisos that R_3 is a hydrogen atom when R_2 is a fluorine atom, R_1 is a fluorine atom when R_3 is a chlorine atom and R_1 is a fluorine or bromine atom when R_2 and R_3 both are hydrogen atoms; and their non-toxic acid addition salts; and having dopamenergic activity.

4,003,933

HYDROGENATION OF NITRILES IN ABSENCE OF SECONDARY REACTION SUPPRESSANT

Charles A. Drake, Nowata, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed July 16, 1975, Ser. No. 596,350

Int. Cl.² C07C *87/14*

U.S. Cl. 260—583 K **16 Claims**

1. A process for the catalytic hydrogenation of at least one nitrile having the formula $(A)_xR(C \equiv N)_y$ wherein x is zero or an integer and y is an integer, R is a hydrocarbyl radical having a valence of $x+y$, and each A is selected from the group consisting of —OR′ and —NR′₂ wherein each R′ is individually selected from the group consisting of hydrogen and hydrocarbyl radicals havir.g from 1 to 10 carbon atoms, to produce primary amines; comprising contacting said at least one nitrile with hydrogen and a catalyst under first suitable hydrogenation conditions in the at least substantial absence of any secondary amine formation suppressant; said catalyst comprising at least one first component selected from the group consisting of elemental Group VIII metals and compounds of Group VIII metals which are reducible by hydrogen to the corresponding elemental metal at said hydrogenation conditions, and at least one second component selected from the group consisting of elemental Group IVB metals and compounds of Group IVB metals which are reducible by hydrogen to the corresponding elemental metal at said hydrogenation conditions.

4,003,934

DI-BICYCLO[3.1.1] AND [2.2.1]HEPTYL AND DI-BICYCLO[3.1.1] AND [2.2.1]HEPTENYL KETONES

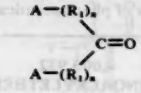
Nathaniel Grier, Englewood, N.J., and Richard A. Dybas, Center Square, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Sept. 2, 1975, Ser. No. 609,772

Int. Cl.² C07C *49/61, 49/43*

U.S. Cl. 260—586 G **20 Claims**

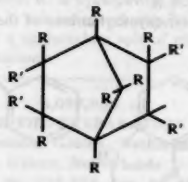
1. A compound of the formula:



where:

each A is alike or different and is a [2.2.1] bicyclic group of the formula:

a.



or a [3.1.1] bicyclic group of the formula:

b.

where R is alike or different and is hydrogen or C_1 to C_4 alkyl, R′ is alike or different and is hydrogen or C_1 to C_4 alkyl or R′ on adjacent carbon atoms taken together comprise an olefinic bond, and the dashed line indicates either saturation or c-, d- or d-, e- unsaturation;

each R_1 is alike or different and is C_1 to C_4 alkylene; and each *n* is alike or different and is the integer 0 or 1.

4,003,935

7-METHYL-OCTAHYDRO-1,4-METHANO-NAPHTHALEN-6-ONE

Erling Sundt, Pinchat-Geneva, Switzerland, assignor to Firmenich S.A., Geneva, Switzerland

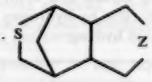
Division of Ser. No. 528,729, Dec. 2, 1974, Pat. No. 3,968,070, which is a continuation of Ser. No. 292,723, Sept. 27, 1972, abandoned. This application Feb. 27, 1976, Ser. No. 662,251

Claims priority, application Switzerland, May 19, 1972, 7456/72; Oct. 11, 1971, 14784/71

Int. Cl.² C07C *49/36*

U.S. Cl. 260—586 G **1 Claim**

1. Cycloaliphatic compounds of formula



wherein the symbol Z represents a radical of formula

(d)

and X represents a divalent radical of formula

(e)

4,003,936

2-HYDROCINNAMPYL-1,3-CYCLOPENTANEDIONES

Masaji Ohno; Mutsuo Katnoka, and Norio Kawabe, both of Kamakura, Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Tokyo, Japan

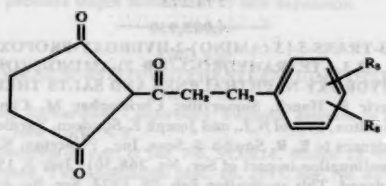
Filed Nov. 26, 1971, Ser. No. 202,597

Claims priority, application Japan, Dec. 15, 1970, 45-111292; Mar. 8, 1971, 46-11787; Apr. 15, 1971, 46-23501

Int. Cl.² C07C *49/76, 49/80, 49/82, 49/84*

U.S. Cl. 260—590 C **13 Claims**

1. 2-hydrocinnamoyl-1,3-cyclopentanedione of the formula:



wherein R_5 and R_6 may be the same or different and may be halogen, hydroxyl, a lower alkyl of 1–4 carbon atoms or a lower alkoxyl of 1–4 carbon atom.

4,003,937

METHOD FOR THE PREPARATION OF YTTERBIUM(III) BETA-DIKETONATES

Pierpaolo Garibaldi, San Donato Milanese, and Fausto Calderazzo, Ghezzano, both of Italy, assignors to Snam Progretti S.p.A., San Donato Milanese, Italy

Filed Dec. 10, 1975, Ser. No. 639,445

Claims priority, application Italy, Dec. 10, 1974, 30337/74

Int. Cl.² C07F *5/00*

U.S. Cl. 260—429.2 **6 Claims**

1. A method for the preparation of ytterbium (III) beta-diketonates comprising of reacting an anhydrous ytterbium (III) halide with a chelating agent selected from the group consisting of acetylacetone, dibenzoylmethane and dipivaloylmethane in the presence of gaseous ammonia and of a nonaqueous solvent.

4,003,938

MANUFACTURE OF ALIPHATIC ISOCYANATES

Karl-Heinz Koenig, Frankenthal; Siegfried Kersten, Ludwigshafen, and Christian Reitel, Heidelberg, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Mar. 4, 1976, Ser. No. 663,968

Claims priority, application Germany, Mar. 21, 1975, 2512514

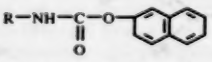
Int. Cl.² C07C *118/00*

U.S. Cl. 260—453 P **3 Claims**

1. A process for the manufacture of aliphatic isocyanates of the general formula I

I

in which R denotes straight-chain or branched-chain alkyl of from 1 to 10 carbon atoms or alkenyl of from 2 to 6 carbon atoms, wherein β-naphthyl carbamates of the general formula II

 II

in which R has the meanings stated above, are thermally decomposed at a temperature of from 150° to 500° C.

4,003,939

ADDITION OF SULFENYL HALIDES TO OLEFINS AND ACETYLENES

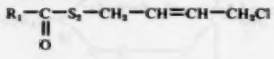
Wolfgang H. Mueller, Elizabeth; Alexis A. Oswald, Mountainside, and Daniel N. Hall, Linden, all of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation of Ser. No. 836,128, June 24, 1969, abandoned, which is a continuation-in-part of Ser. No. 595,559, Oct. 28, 1966, abandoned. This application July 10, 1975, Ser. No. 594,593

Int. Cl.² C07C *179/22*

U.S. Cl. 260—453 RZ 1 Claim

1. Compounds selected from the group of compounds represented by the general formula:



wherein R_1 is selected from the group consisting of C_1–C_{14} alkyl radicals and C_6–C_{16} aryl radicals.

4,003,940

ALKYNYL PHENYLPHENOL DIVALENT ALIPHATIC SULFITES

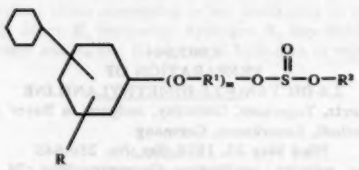
Rupert A. Covey, Bethany, and Robert E. Grahame, Jr., Cheshire, both of Conn., assignors to Uniroyal Inc., New York, N.Y.

Division of Ser. No. 414,047, Nov. 8, 1973, Pat. No. 3,916,005. This application July 23, 1975, Ser. No. 598,463

Int. Cl.² C07C *137/00*

U.S. Cl. 260—456 NS 9 Claims

1. A sulfite having the structure:



wherein R is hydrogen, bromine, chlorine, iodine or an alkyl radical having not more than 6 carbon atoms;

R^1 is an alkylene radical selected from the group consisting of ethylene, 1,2-propylene, 1 2-butylene and 2,3-butylene

R^2 is an alkynyl group containing from 3 to 6 carbon atoms; and,

m is an integer from 1 to 3.

4,003,941

PROCESS FOR PRODUCING POLYHALOCARBONS OXIDES

George H. Crawford, White Bear Lake, and Nicholas Kowanko, Minneapolis, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 525,357, Feb. 7, 1966, abandoned. This application May 16, 1973, Ser. No. 360,905

Int. Cl.² C08G *67/00*; C07C *43/17*

U.S. Cl. 260—463 7 Claims

1. A process for producing polyhalocarbon oxides comprising introducing into a reaction zone as the only essential reactive components ozone and an acyclic perhaloolefin having 3 to 6 carbon atoms, while maintaining said perhaloolefin under liquid phase conditions for a period of time sufficient to directly produce, in the absence of ultraviolet light, polyhalocarbon oxide polymer substantially free of oxidizing linkages.

5. A process for producing polyfluorocarbon oxides comprising introducing into a reaction zone as the sole essential reactive components liquid perfluoropropene and ozone and reacting said components at about −30° C. to −100° C. for a period of time sufficient to directly produce, in the absence of ultraviolet light, polyfluorocarbon oxide polymers substantially free of oxidizing linkages.

4,003,942

BLOCKED BIS 2-CYANOACRYLATE MONOMERS

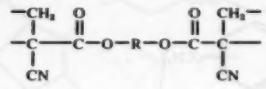
Carl J. Buck, Berkeley Heights, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Division of Ser. No. 512,276, Oct. 4, 1974, which is a continuation-in-part of Ser. No. 308,375, Nov. 21, 1972, abandoned, and a continuation-in-part of Ser. No. 308,376, Nov. 21, 1972, abandoned. This application Nov. 18, 1975, Ser. No. 633,145

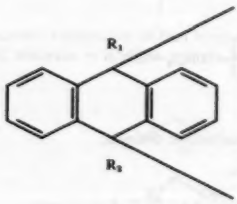
Int. Cl.² C07C *121/48*, *121/70*

U.S. Cl. 260—464 2 Claims

1. As a new composition of matter a compound represented by the formula V



wherein D is selected from the group consisting of



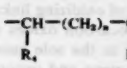
where R_1 and R_2 are the same R_1 and R_2 may be H, an alkyl group of 1 to 5 carbons, phenyl, Br or Cl and where R_1 and R_2 are different, R_1 is H and R_2 may be any of the group consisting of an alkyl group of 1 to 5 carbons, phenyl, Br and Cl;

where R_3 is H or CH_3; and

wherein the organo linking group R of Formula V is any one of the group consisting of:

$-(CH_2)_m-$,

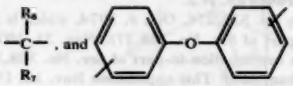
where *m* is an integer of from 1 to 20 inclusive;



where *n* is an integer of from 0 to 18 inclusive, and R_4 and R_5 are independently hydrogen or a C_1 to C_5 alkyl group, R_4 and R_5 not simultaneously being hydrogen;

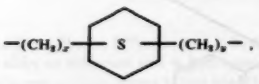
$$-(CH_2)_r-Z-(CH_2)_s-,$$

where Z is —O—, —S—, —CH=CH—; —C C—;



where *r* and *s* are independent integers of from 1 to 10 inclusive and *r* and *s* total from 2 to 20, R_6 and R_7 are independently hydrogen or a straight or branched chain C_1 to C_5 alkyl group;

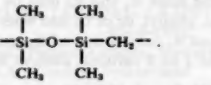
where *x* and *y* are integers of from 1 to 6 inclusive;



where *x* and *y* are as hereinbefore defined;

$$-CH_2-(CF_2)_z-CH_2-,$$

where *z* is an integer of from 1 to 10 inclusive; and



4,003,943

SUBSTITUTED TRIMETHYLENE CYCLOPROPANES, SALTS THEREOF, INTERMEDIATES AND METHODS OF MAKING THE SAME

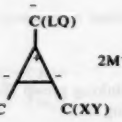
Tadamichi Fukunaga, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 535,138, Dec. 20, 1974, Pat. No. 3,963,769. This application Mar. 2, 1976, Ser. No. 663,102

Int. Cl.² C07C *121/60, 121/66, 121/76*

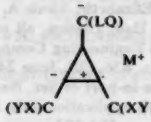
U.S. Cl. 260—465 H **8 Claims**

1. A compound having the formula:



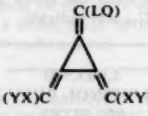
wherein X and Y are selected from cyano, —COO (lower alkyl) or —CO (lower alkyl); L and O are selected pairwise from phenyl and cyano, phenacetyl and cyano or benzenesulfonyl and cyano; and M^+ is one equivalent of an inert cation.

3. A compound having the formula:



wherein X and Y are selected from cyano, —COO (lower alkyl) or —CO (lower alkyl); L and Q are selected pairwise from phenyl and cyano, phenacetyl and cyano or benzene sulfonyl and cyano; and M^+ is one equivalent of an inert cation.

5. A compound having the formula:



wherein X and Y are selected from cyano, —COO (lower alkyl) or —CO (lower alkyl); and L and Q are selected pairwise from phenyl and cyano, phenacetyl and cyano or benzenesulfonyl and cyano.

4,003,944

PREPARATION OF 2,4-DICYANO-3,5-DIMETHYLANILINE

Peter Kurtz, Tegernsee, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

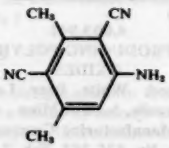
Filed May 25, 1972, Ser. No. 256,845

Claims priority, application Germany, May 25, 1971, 2125907

Int. Cl.² C07C *121/78*

U.S. Cl. 260—465 E **3 Claims**

1. A process of the preparation of a compound of the formula



which comprises heating a starting compound having the empirical $C_{12}H_{12}N_4$ and a melting point of 204°–205° C, in a vacuum of 0.01 to 50 mm Hg and at a temperature of 150° to 250° C; said starting compound comprising the product which can be obtained by dimerizing 3-methylene-glutaric acid dinitrile or 3-methyl-glutaconic acid dinitrile by heating in an inert solvent.

4,003,945

NOVEL CYCLOPROPANECARBOXYLATES

Shigeyoshi Kitamura, Saitama; Nobushige Itaya, Nishinomiya; Yoshitoshi Okuno; Nobuo Ohno, both of Toyonaka; Takashi Matsuo, Nishinomiya; Masachika Hirano; Toshio Mizutani, both of Toyonaka, and Hisami Takeda, Takarazuka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

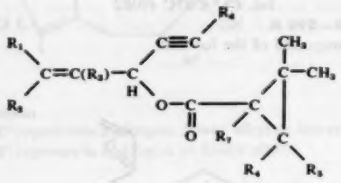
Filed Apr. 15, 1974, Ser. No. 461,029

Claims priority, application Japan, Apr. 20, 1973, 48-45915; May 24, 1973, 48-58830; June 4, 1973, 48-63118

Int. Cl.² C07C 9/74

U.S. Cl. 260—468 H 5 Claims

1. Alkynyl cyclopropanecarboxylic acid esters represented by the formula (I),



wherein R_1 represents hydrogen, halogen, lower alkyl having up to 5 carbon atoms, lower alkenyl having up to 5 carbon atoms, lower alkynyl having up to 5 carbon atoms, C_1–C_4 alkoxy C_1–C_4 alkyl, C_1–C_4 alkylthio C_1–C_4 alkyl, phenyl, phenyl C_1–C_4 alkyl, furyl, thienyl, furfuryl, thenyl, cyclo C_3–C_6 alkyl or cyclo C_3–C_6 alkenyl; R_2 and R_3 individually represent hydrogen, halogen, lower alkyl having up to 5 carbon atoms, lower alkenyl having up to 5 carbon atoms, lower alkynyl having up to 5 carbon atoms, phenyl, phenyl C_1–C_4 alkyl or may form a carbon-carbon bond; or R_1 and R_3 are bonded to each other at the ends to form a C_3–C_4 polymethylene chain containing or not containing an oxygen or a sulfur atom, or R_1 and R_2 are bonded to each other at the ends to form a C_3 polymethylene chain containing or not containing an oxygen or a sulfur atom; R_4 represents hydrogen R_5 represents 2,2-dichlorovinyl and R_6 and R_7 represent hydrogen or methyl.

4,003,946

4,5-CIS-DIDEHYDRO-PGF, ANALOGS

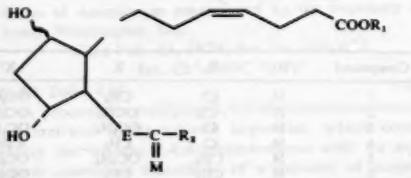
Barney J. Magerlein, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 440,629, Feb. 7, 1974, Pat. No. 3,933,889, which is a continuation-in-part of Ser. No. 247,993, April 27, 1972, abandoned. This application Nov. 7, 1975, Ser. No. 629,873

Int. Cl.² C07C 177/00

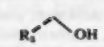
U.S. Cl. 260—468 D 32 Claims

1. An optically active compound of the formula



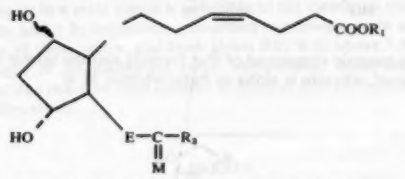
or a racemic compound of that formula and the mirror image thereof, wherein ~ is alpha or beta; wherein M is

or

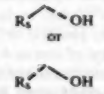


wherein R_8 is hydrogen, methyl, or ethyl; wherein R_1 is hydrogen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; wherein R_3 is alkyl of 2 to 4 carbon atoms, inclusive, substituted with zero to 2 fluoro, inclusive; and wherein E is trans—CH=CH— or $—CH_2CH_2—$; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when R_1 is hydrogen.

10. An optically active compound of the formula

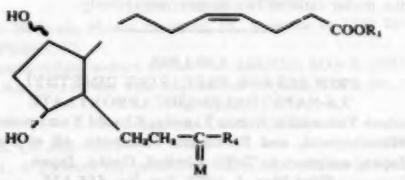


or a racemic compound of that formula and the mirror image thereof, wherein ~ is alpha or beta; wherein M is

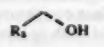


wherein R_8 is hydrogen, methyl, or ethyl; wherein R_1 is hydrogen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; wherein R_3 is branched-chain alkyl of 5 carbon atoms or alkyl of 5 carbon atoms substituted with one or 2 fluoro; and wherein E is trans—CH=CH— or $—CH_2CH_2—$; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when R_1 is hydrogen.

17. An optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof, wherein M is

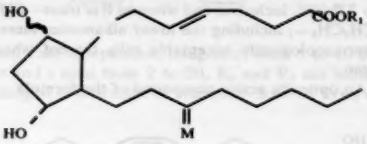


-continued

or

wherein R_3 is hydrogen, methyl, or ethyl; wherein R_1 is hydrogen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; and wherein R_4 is alkyl of 6 to 10 carbon atoms, inclusive, substituted with zero to 2 fluoro, inclusive; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when R_1 is hydrogen.

29. An optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof, wherein is alpha or beta; wherein M is

wherein R_3 is hydrogen, methyl, or ethyl; and wherein R_1 is hydrogen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when R_1 is hydrogen.

4,003,947

COATING COMPOSITION AND METHOD OF COATING SUBSTRATES THEREWITH

Marvin A. Peterson, Fort Wayne, Ind., assignor to General Electric Company, Fort Wayne, Ind.

Filed June 3, 1974, Ser. No. 475,483
Int. Cl.² C07C *103/74*
U.S. Cl. 260—471 R **5 Claims**

1. A heat curable monomeric coating material comprising an aromatic diamide diacid diamine formed as the reaction product of an aromatic diamine and an aromatic dianhydride in the molar ratio of two-to-one respectively.

4,003,948

PROCESS FOR PREPARING DIMETHYL 2,6-NAPHTHALENEDICARBOXYLATE

Gentaro Yamashita; Nobuo Taneda; Kiyoshi Yamamoto; Toru Matsubayashi, and Hiromitsu Takamoto, all of Iwakuni, Japan, assignors to Teijin Limited, Osaka, Japan

Filed Mar. 4, 1975, Ser. No. 555,125
Claims priority, application Japan, Oct. 2, 1974, 49-112822; Mar. 8, 1974, 49-26338
Int. Cl.² C07C *69/76*
U.S. Cl. 260—475 FR **7 Claims**

1. A process for preparing dimethyl 2,6-naphthalenedicarboxylate, which comprises continuously esterifying 2,6-naphthalenedicarboxylic acid with methanol at a temperature of about 140° to 350° C. in the presence or absence of an esterifying catalyst, said 2,6-naphthalenedicarboxylic acid being fed into an esterification reaction zone in the form of solid particles having a specific surface area of from about 4,000 cm^2/g to about 100,000 cm^2/g.

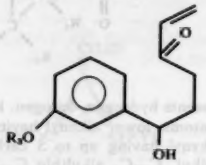
4,003,949

STEROID INTERMEDIATES

Noal Cohen, Montclair, and Gabriel Saucy, Essex Fells, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 406,980, Oct. 16, 1973, Pat. No. 3,932,519, which is a division of Ser. No. 100,372, Dec. 21, 1970, abandoned. This application Sept. 24, 1975, Ser. No. 616,230
Int. Cl.² C07C *49/82*
U.S. Cl. 260—590 R **3 Claims**

1. The compound of the formula



where R_3 is a cycloalkyl group of 3 to 8 carbon atoms, or a primary alkyl group of from 1 to 8 carbon atoms.

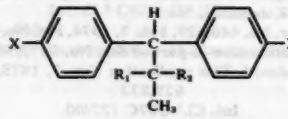
4,003,950

DIPHENYL METHANE BIODEGRADABLE INSECTICIDES

Robert L. Metcalf, and Joel R. Coats, both of Urbana, Ill., assignors to University of Illinois Foundation, Urbana, Ill.

Filed Nov. 4, 1974, Ser. No. 520,370
Int. Cl.² C07C *43/20*
U.S. Cl. 260—612 R **9 Claims**

1. Biodegradable insecticides having the formula:



wherein R_1, R_2, X and X′ are groups having the relationships shown in the following table in the compounds numbered 1 through 8:

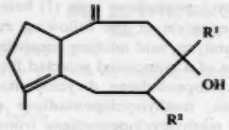
Compound	R_1	R_2	X	X′
1	H	Cl	CH_3	OC_2H_5
2	H	Cl	OCH_3	OC_2H_5
3	H	Cl	OC_2H_5	OC_2H_7
4	H	Cl	CH_3	C_2H_7
5	H	CH_3	OC_2H_5	OC_2H_7
6	H	CH_3	CH_3	OC_2H_5
7	H	CH_3	CH_3	OC_2H_7
8	H	CH_3	CH_3	OC_4H_9

4,003,951
OCTAHYDROAZULENOLS

Peter Naegeli, Wettingen, Switzerland, assignor to Givaudan Corporation, Clifton, N.J.

Division of Ser. No. 363,207, May 23, 1973, Pat. No. 3,935,253. This application Nov. 3, 1975, Ser. No. 628,305
Claims priority, application Switzerland, June 5, 1972, 8265/72
Int. Cl.² C07C *35/34*
U.S. Cl. 260—617 F 3 Claims

1. A compound of the formula



VIII

wherein
R^1 represents hydrogen, lower alkyl or lower alkenyl and
R^2 represents hydrogen or lower alkyl.

4,003,952
DIRECT HYDRATION OF OLEFINS TO ALCOHOLS

Elton Gordon Foster, Houston; Robert A. Golding, Missouri City, and Delwin E. Dodd, Houston, all of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Sept. 23, 1974, Ser. No. 508,030
Int. Cl.² C07C *29/04, 29/24*
U.S. Cl. 260—641 3 Claims

1. In the direct hydration process of producing ethanol by reaction ethylene with water in a reaction zone and in the presence of a catalyst whereby the ethanol along with a portion of the organic impurities produced as byproducts in the reaction including predominantly diethyl ether, are recovered from the effluent from said reaction zone in a scrubbing zone in which water is employed as a scrubbing agent, the improvement which comprises introducing said reaction zone effluent at an intermediate point in the scrubbing zone, introducing water near the top of the scrubbing zone, and introducing at least about 25% of the fresh ethylene feed stream near the bottom of the scrubbing zone, the ethylene thereby stripping the diethyl ether from the aqueous alcohol comprising the scrubber liquid bottom product and producing an aqueous alcohol product as scrubber liquid bottom product containing no more than trace amounts of diethyl ether.

4,003,953
PURIFICATION OF TNT WITH MAGNESIUM SULFITE-BISULFITE MIXTURES

Everett E. Gilbert, Morristown, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 23, 1976, Ser. No. 660,073
Int. Cl.² C07C *79/10*
U.S. Cl. 260—645 7 Claims

1. A process for purifying 2,4,6-trinitrotoluene containing unsymmetrical trinitrotoluene impurities, which comprises reacting the impure 2,4,6-trinitrotoluene with an aqueous medium consisting essentially of a mixture of magnesium sulfite and magnesium bisulfite to convert said isomeric impurities into products soluble in said aqueous medium, and separating the purified 2,4,6-trinitrotoluene from the aqueous medium containing said soluble conversion products.

4,003,954
HYDROPROCESSING AROMATICS TO MAKE CYCLOPARAFFINS

Ernest L. Pollitzer, Skokie, and John C. Hayes, Palatine, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 538,240, Jan. 2, 1975, Pat. No. 3,957,624. This application Mar. 31, 1976, Ser. No. 672,183
Int. Cl.² C07C *5/10*; C10G *13/04*; B01J *23/62*
U.S. Cl. 260—667 4 Claims

1. A process for producing a cycloparaffinic hydrocarbon which comprises contacting hydrogen and an aromatic hydrocarbon in a reaction zone, in contact with a catalytic composite comprising a porous carrier material containing, on a elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.5 to about 5 wt. % cobalt, about 0.01 to about 5 wt. % germanium and about 0.1 to about 3.5 wt. % halogen, wherein the platinum group metal, cobalt and germanium are uniformly dispersed throughout the porous carrier material, wherein substantially all of the platinum group metal is present in the elemental metallic state, wherein substantially all of the germanium is present in an oxidation state above that of the elemental metal, and wherein substantially all of the catalytically available cobalt is present in the elemental metallic state or in a state which is reducible to the elemental metallic state under hydrocarbon conversion conditions, or in a mixture of these states, and from about 0.01% to about 1.5% by weight of an alkalinous metal component, separating the resulting reaction zone effluent to recover said cycloparaffinic hydrocarbon.

4,003,955
DEHYDROCYCLIZATION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

John C. Hayes, Palatine, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 490,171, July 19, 1974, Pat. No. 3,948,762. This application Mar. 8, 1976, Ser. No. 664,458
Int. Cl.² C07C *3/04*; C10G *23/04*; B01J *27/08, 23/62*
U.S. Cl. 260—673.5 25 Claims

1. A method for dehydrocyclizing a dehydrocyclizable hydrocarbon comprising contacting the hydrocarbon at dehydrocyclization conditions with an acidic catalytic composite comprising a porous carrier material containing, or an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % rhodium, about 0.01 to about 5 wt. % nickel and about 0.1 to about 3.5 wt. % halogen; wherein the platinum or palladium, rhodium and nickel are uniformly dispersed throughout the porous carrier material; and wherein substantially all of the platinum or palladium, rhodium and nickel are present in the elemental metallic state.

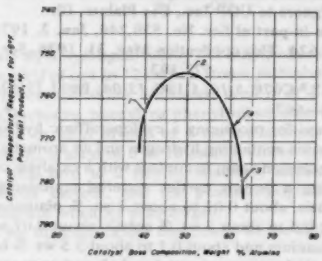
4,003,956
HYDROPROCESSING AROMATICS TO CYCLOPARAFFINS

Lee Hilfman, Mount Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 466,759, May 3, 1974, Pat. No. 3,931,048. This application July 28, 1975, Ser. No. 599,561
Int. Cl.² C07C *5/10*
U.S. Cl. 260—667 5 Claims

1. A process for producing a cycloparaffinic hydrocarbon which comprises contacting hydrogen and an aromatic hydrocarbon in a reaction zone, in a contact with a tungsten component catalytic composite consisting essentially of a combination of a nickel component, and a tungsten component with a silica-alumina carrier material wherein said carrier material is co-gelled silica-alumina consisting of from about 43 percent to about 57 percent by weight alumina and from about 57 to about 43 percent by weight silica and wherein said compo-

nents are present in amounts sufficient to result in the composite containing, on an elemental basis, about 2 to about 10 percent by weight of the nickel component and about 8 to



about 20 percent by weight of the tungsten component, and from about 0.01 to about 1.5% by weight of an alkalinous metal component, separating the resulting reaction zone effluent to recover said cycloparaffinic hydrocarbon.

4,003,957

DEHYDROCYCLIZATION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

George J. Antos, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 550,083, Feb. 14, 1975, Pat. No. 3,939,059. This application Feb. 5, 1976, Ser. No. 655,661

Int. Cl.² C07C *3/04;* **C10G** *23/04;* **B01J** *27/08, 23/67*

U.S. Cl. 260—673.5 **24 Claims**

1. A method for dehydrocyclizing a dehydrocyclizable hydrocarbon comprising contacting the hyrocarbon at dehydrocyclization conditions with a catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.1 to about 5 wt. % cobalt, about 0.01 to about 2 wt. % rhenium and abot 0.1 to about 3.5 halogen; wherein the platinum group metal, catalytically available cobalt and rhenium are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum group metal is present in the elemental metallic state; and wherein substantially all of the rhenium and catalytically available cobalt are present in the elemental metallic state or in a state which is reducible to the element metallic state under dehydrocyclization conditions or in a mixture of these states.

4,003,958

PROCESS FOR PRODUCING MYRCENE

Atsuo Murata; Shuji Tsuchiya; Akihiro Konno, all of Funabashi; Juntaro Tanaka, and Kunihiko Takabe, both of Hamamatsu, all of Japan, assignors to Nissan Chemical Industries, Ltd., Tokyo, Japan

Filed Sept. 25, 1975, Ser. No. 616,625

Claims priority, application Japan, Sept. 26, 1974, 49-110748; July 16, 1975, 50-86993

Int. Cl.² C07C *11/12*

U.S. Cl. 260—677 R **9 Claims**

1. A process for producing myrcene which comprises dimerizing isoprene in a solvent of a cyclic ether, N-alkylmorpholine or mixtures thereof, with 0.5 – 20 mole% of an alkali metal catalyst and 1–20 mole% of a primary or secondary amine having branched-chain hydrocarbon residual groups, wherein the mole percentages are based on the amount of isoprene.

4,003,959

EPOXY RESIN COMPOSITIONS CONTAINING CYCLOPENTADIENE COPOLYMER

Akira Wada, Kamakura, and Kazunobu Karino, Yokohama, both of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

Filed Dec. 16, 1974, Ser. No. 533,249

Claims priority, application Japan, Dec. 20, 1973, 48-142616

Int. Cl.² C08L *63/00*

U.S. Cl. 260—837 R **3 Claims**

1. An epoxy resin composition comprising (I) 10 to 70% by weight of a cyclopentadiene resin, (II) 90 to 30% by weight of an epoxy resin (II) and an effective amount of a curing agent for the epoxy resin, said cyclopentadiene resin (I) being prepared by thermal polymerization of the following mixture without polymerization catalysts, said mixture consisting of

A. 85 to 35% by weight of a compound selected from the group consisting of cyclopentadiene, dicyclopentadiene, methylcyclopentadiene, methylcyclopentadiene dimer, cyclopentadiene and methylcyclopentadiene trimer and tetramer, and

B. 15 to 65% by weight of at least one compound selected from the group consisting of unsaturated nitriles containing 3 to 6 carbon atoms, unsaturated monocarboxylic acids containing 3 to 4 carbon atoms, unsaturated monocarboxylic acid containing 3 to 4 carbon atoms and glycides or aliphatic alcohols containing 1 to 8 carbon atoms, alkenyl alkanoates derived from aliphatic monocarboxylic acids containing 1 to 4 carbon atoms and vinyl alcohol or allyl alcohol, α,β-unsaturated dicarboxylic acids containing 4 to 5 carbon atoms, mono- and di-esters derived from α,β-unsaturated dicarboxylic acids containing 4 to 5 carbon atoms an aliphatic alcohols containing 1 to 8 carbon atoms, and unsaturated aldehydes containing 3 to 6 carbon atoms,

C. 0 to 30% by weight of α,β-unsaturated dicarboxylic anhydrides containing 4 to 5 carbon atoms, and

D. 0 to 30% by weight of unsaturated hydrocarbon compounds containing 3 to 10 carbon atoms, and having an acid number of not more than 150, a bromine number of not more than 75 and a softening point of not more than 170° C.

4,003,960

BLOCK COPOLYMERS

Pierino Radici, Turate (Como); Gaudenzio Bianchi, Fagnano Olona (Varese); Daniele Colombo, Castellanza (Varese), and Paolo Colombo, Saronno (Varese), all of Italy, assignors to Societa Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Dec. 22, 1975, Ser. No. 642,810

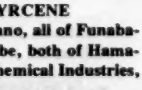
Claims priority, application Italy, Dec. 20, 1974, 30830/74

Int. Cl.² C08L *77/00*

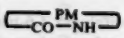
U.S. Cl. 260—857 F **12 Claims**

1. A block copolymer of the structure A-B wherein:

A is a polylactamic block consisting of a chain of recurring units:



obtainable from one or more monomeric lactams of the formula



wherein PM is a linear polymethylene chain having from 3 to 13 carbon atoms, non substituted or having at least one hydrogen atom replaced by a radical selected in the group consisting of the alkyl, aryl, alkylaryl and cycloalkyl radicals,

B is a polyoxymethylene block consisting of recurring units, said block B being present in the copolymer in an amount of at least 2% by weight, and said block A being present in the copolymer in an amount of at least 0.05% by weight.

4,003,961

LINEAR COPOLYMERS OF GLYCIDOL

Violete L. Stevens; Arthur R. Sexton, and Frederick P. Corson, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 444,078, Feb. 20, 1974. This application Dec. 22, 1975, Ser. No. 643,451
Int. Cl.² C08G 23/22
U.S. Cl. 260—874 4 Claims

1. The process of making compounds of the formula R

$((R'O)_mX)_n$

wherein R is the residue left by the removal of n active hydrogen atoms from an initiator compound, RH_n; each R′ independently is an alkylene radical selected from the group consisting of ethylene, trimethylene, tetramethylene, 1,2-butylene, 2,2-bis(halomethyl)-1,3-propylene, and groups of the formula

$$-CH_2CHCH_2A$$

each A independently is H, Cl, Br, or OX; each X independently is H or the acyl radical of a carboxylic acid with the proviso that at least one R′ is 3-hydroxy-1,2-propylene and at least one is a group of the formula

$$-CH_2CHCH_2OX$$

wherein X is the acyl radical of an α,β-unsaturated carboxylic acid; and m and n are integers such that the total number of R′O groups is at least 2;

said process comprising reacting by contacting an α,β-unsaturated carboxylic acid or the anhydride or acyl halide corresponding to such acid with a polymer or copolymer of tert.-butyl glycidyl ether in the presence of a strong acid catalyst.

4,003,962

METHOD OF PREPARING AN EASY PROCESSING POLYVINYL HALIDE BY AN IN-PROCESS REACTION

Akio Takahashi, Amherst, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 318,781, Dec. 27, 1972, abandoned. This application Feb. 24, 1975, Ser. No. 552,583
Int. Cl.² C08L 27/00
U.S. Cl. 260—884 14 Claims

1. A process for producing a graft copolymer composition comprising grafting a monomeric vinyl ester and maleic anhydride onto a vinyl halide polymer comprising at least 50 percent by weight of vinyl halide, in the presence of a free radical initiator at a temperature of about 150° to about 180° centigrade.

4,003,963

VINYL CHLORIDE POLYMER BARRIER PACKAGING COMPOSITIONS

Walter Stanley Creasy, Bridgewater, and Austin Emidio Barnabeo, Somerville, both of N.J., assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 8, 1975, Ser. No. 638,303
Int. Cl.² C08L 23/08
U.S. Cl. 260—897 C 12 Claims

1. Composition suitable for the fabrication of barrier packaging materials having enhanced resistance to oxygen permeability as well as moisture vapor transmission consisting essentially of a mixture of:

A. A vinyl chloride polymer having no carboxyl groups, and

B. About 10 to about 30 percent by weight, based on the weight of vinyl chloride polymer, of an ethylene/vinyl alcohol copolymer containing greater than about 61 weight percent or 50 mole percent of vinyl alcohol in said copolymer.

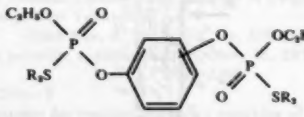
4,003,964

PHENYLENE-BIS(O,S-DIALKYLTHIOPHOSPHATES)

Alexis A. Oswald, Mountainside, and Paul L. Valint, Jr., Woodbridge, both of N.J., assignors to Ciba-Geigy AG, Basel, Switzerland

Division of Ser. No. 328,588, Feb. 1, 1973, Pat. No. 3,876,666. This application Mar. 12, 1975, Ser. No. 557,559
Claims priority, application Switzerland, Feb. 1, 1972, 1498/72; Dec. 29, 1972, 19075/72
Int. Cl.² A01N 9/36; C07F 9/18
U.S. Cl. 260—930 2 Claims

1. A compound of the formula



in which R_2 is n-propyl or isobutyl

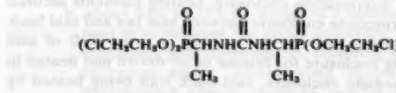
4,003,965

PHOSPHORUS COMPOUNDS

Gail H. Birum, Kirkwood, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 385,931, Aug. 6, 1973, Pat. No. 3,920,733. This application June 23, 1975, Ser. No. 589,097
Int. Cl.² C07F 9/40
U.S. Cl. 260—932 2 Claims

1. A compound of the formula



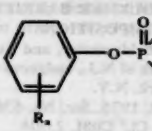
4,003,966

SELECTIVE PHOSPHORYLATION PROCESS

Roger Paul Napier, Califon, N.J., and Orville L. Chapman, Los Angeles, Calif., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Feb. 10, 1975, Ser. No. 548,508
Int. Cl.² C07F 9/09
U.S. Cl. 260—971 9 Claims

1. A process for the selective preparation of O,O-dialkyl phosphates of phenols having the following general formula:



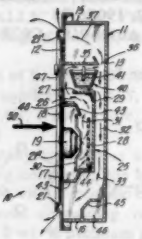
wherein R is selected from the group consisting of H, alkyl of 1–8 carbon atoms, nitro, nitroso, halo, carboxy, carbalkoxy, alkythio, alkylmercapto and haloalkyl of 1–8 carbon atoms, hydroxymethyl, mercaptomethyl, N-hydroxyiminomethyl and *n* is 1–5; R_1 is alkyl of 1–8 carbon atoms; and R_2 is selected from the group consisting of alkyl of 1–8 carbon atoms, alkoxy, amino and mono or dialkylamino C_1–C_{18} comprising reacting under ambient conditions such phenol with dimethyl disulfide and a trialkyl phosphite each alkyl group thereof having from 1–12 carbon atoms.

4,003,967

ELECTRIC HEATING AND HUMIDIFYING APPARATUS

Alfred Marcel Potvin, St. Lambert, Canada, assignor to Les Placement Courteau Limitee, Montreal, Canada

Filed Oct. 31, 1974, Ser. No. 519,696
Int. Cl.² B01F *3/04*
U.S. Cl. 261—30 **4 Claims**



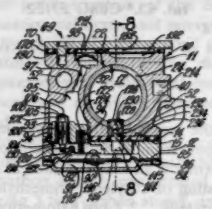
1. A space heating apparatus comprising a main enclosure having a front and a rear wall, side walls and a top and bottom wall; an air inlet opening in said front wall, a filter in said opening, an impeller fan mounted within said enclosure adjacent said opening for drawing outside air into said enclosure through said filter and convecting it through predetermined paths in said enclosure and out of said enclosure through vent openings provided therein, and intermediate enclosure secured between said front and rear walls and having a back wall spaced from said main enclosure rear wall to permit passage of convected air in a space between said back wall and rear wall, said intermediate enclosure being positioned about said opening in said front wall whereby said impeller fan is located within said intermediate enclosure, heating elements secured in said intermediate enclosure between said fan and said back wall for heating said air, an opening in a top wall of said intermediate enclosure for release of air drawn and heated in said intermediate enclosure, said back wall being heated by said heating elements to further heat convected air passing between said back wall and rear wall, a water reservoir having a heater therein for heating water in said reservoir to the boiling point whereby water vapour is mixed with the air convected through said predetermined paths, a horizontal intermediate wall secured a predetermined distance above said intermediate enclosure and said water reservoir and located between said front and rear wall of said main enclosure, and an opening in said horizontal intermediate wall to permit passage of some of said convected air therethrough and out through said vent opening above said intermediate enclosure, said opening in said intermediate enclosure being located adjacent said main enclosure front wall, and said opening in said horizontal intermediate wall being located adjacent said main enclosure rear wall, and control means for regulating the operation time cycle of said fan, heating elements and heater, there being at least three times as much air directed downwardly than that directed upwardly in said housing.

4,003,968

CHARGE FORMING METHOD AND APPARATUS

Paul E. Rickert, Oregon, Ohio, assignor to Borg-Warner Corporation, Chicago, Ill.

Continuation of Ser. No. 365,960, June 1, 1973, abandoned.
This application Oct. 31, 1975, Ser. No. 627,871
Int. Cl.² F02M *17/04*
U.S. Cl. 261—35 **24 Claims**



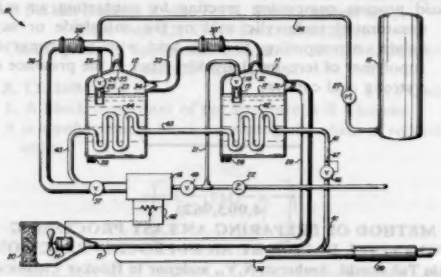
1. Charge forming apparatus comprising, in combination, a body construction including a first body member providing a fuel and air mixing passage, a second body member providing a fuel cavity, aperture means opening into the mixing passage, fluid flow control laminar means disposed between the body members having perforate pattern regions providing passages for fuel and air, a flexible diaphragm forming one wall of the fuel cavity, a recess in the second body member, a fuel inlet valve disposed for slidable movement in said recess, and means in the fuel cavity arranged to transmit movements of the diaphragm to the inlet valve for controlling fuel flow into the fuel cavity.

4,003,969

CARBURETOR SYSTEM FOR INTERNAL COMBUSTION ENGINE

William C. Robinson, 5720 W. Rosewood Lane, Phoenix, Ariz. 85031

Filed Aug. 7, 1975, Ser. No. 602,690
Int. Cl.² F02M *25/02*
U.S. Cl. 261—145 **4 Claims**



1. A carburetor system for a gasoline engine wherein the fuel vaporization functions are accomplished external to a carburetor comprising in combination:

a gasoline vaporization chamber having fluid inlet and outlet ports,

means for connecting a source of gasoline under pressure to said vaporization chamber,

a first float means for controlling the level of gasoline in said vaporization chamber,

an air intake manifold connected to said inlet port of said

vaporization chamber at a point above the level of gasoline therein,

a water humidification chamber having fluid inlet and outlet ports,

means for connecting a source of water under pressure to said humidification chamber,

a second float means for controlling the level of water in said humidification chamber,

conduit means for connecting said fluid outlet port of said vaporization chamber arranged at a point above the level of gasoline in said vaporization chamber to said inlet port in said humidification chamber arranged at a point above the water in said humidification chamber,

means for connecting said outlet port of said humidification chamber to a carburetor,

means for heating the gasoline and water in said vaporization and humidification chambers,

said means for heating the gasoline and water in said vaporization and humidification chambers comprising a common element extending in sequence through the gasoline and water in the chambers, and

pressure means comprising a fan for forcing air under pressure through said air intake manifold over the gasoline surface in said vaporization chamber, through said conduit means, over the water surface in said humidification chamber and through said outlet port of said humidification chamber to the carburetor.

4,003,970

COMBINED WET AND DRY HEAT TRANSFER SYSTEM AND METHOD FOR COOLING TOWERS

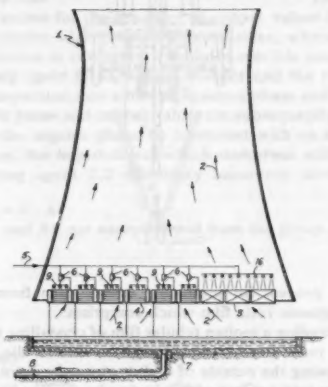
Vladimir Vodicka, Bochum, Germany, assignor to Balcke-Durr Aktiengesellschaft, Ratingen, Germany

Filed Oct. 28, 1975, Ser. No. 626,538

Claims priority, application Germany, Nov. 2, 1974, 2452123

Int. Cl.² F28D *5/02*; F28C *1/02*

U.S. Cl. 261—159 **15 Claims**



1. In a cooling tower installation for the continuous recooling of large quantities of hot cooling water through heat transfer from the water to an air draft generated inside a vertically open tower mantle, an adjustable combined wet and dry heat transfer system comprising in combination:

a plurality of heat exchanger units arranged adjacent to one another within the confines of the cooling tower mantle, so as to occupy substantially the entire cross-sectional area enclosed by the latter;

air flow spaces in the heat exchanger units for the upward passage of air flows through the heat exchanger units;

a water collecting basin arranged underneath the heat exchanger units;

conduit means for bringing a supply of hot water to the heat exchanger units;

a hot water distributing network disposed above the heat exchanger units, including means for distributing the hot water onto surfaces of the heat exchanger units which are also exposed to said air flows;

conduit means for removing the recooled water from the collecting basin; and wherein:

the heat exchanger units comprise a group of so-called wet units, which are operable only for the transfer of heat from downwardly moving flows of water originating from the water distributing network to said upwardly moving air flows, in direct contact therebetween and through evaporation of a portion of the water;

the heat exchanger units further comprise a group of dual-purpose heat exchanger units, having interior water flow channels connectable to said supply conduit means, the channels having walls across which heat is transferable to said upwardly moving air flows in a convective, so-called dry operation, the outer sides of said channel walls being further adapted to guide downwardly moving flows of water originating from the water distributing network, for an evaporative, wet operation; and

the heat transfer system further comprises means for adjusting the vapor content of the heated air leaving the tower, for cloud-free operation, said means including valve and conduit means associated with the hot water supply for selectively operating the dual-purpose heat exchanger units in a dry or wet operating mode, or in both modes simultaneously, by correspondingly controlling the flow of hot water to the water channels inside the units and to the water distributing means arranged above the units.

4,003,971

PRODUCTION OF PARTICLES FOR INCORPORATION IN DENTIFRICES

Giuseppe Mannara, Rome, Italy, assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Nov. 4, 1974, Ser. No. 520,665

Claims priority, application Italy, Nov. 16, 1973, 53749/73

Int. Cl.² B01J *2/06*

U.S. Cl. 264—9 **9 Claims**

1. A process for making dentifrice speckles of substantially uniform shape and size which compriese:

A. agitating a heated mixture of a speckling material and a dispersing liquid for said speckling material, said speckling material containing a dentifrice component and a binder for such component, at a temperature at which the binder is liquid, to produce a homogeneous dispersion in the dispersing liquid of individual droplets of said speckling material of sizes in the range of about 0.05 to 1 mm. effective diameter; said mixture being of about

I. 1 to 40% by weight of such speckling material, which is

a. about 75 to 99.9% by weight of a normally solid water insoluble organic dentifrice binder selected from the group consisting of thermoplastic resins, gums, gels, paraffins, waxes, polymers, higher fatty acids, higher fatty acid salts, lower alkylene glycol diesters, glyceryl diesters and glyceryl triesters; and

b. about 0.01 to 25% by weight of a dentifrice component selected from the group consisting of fluorine-containing anti-caries agents, polishing agents, antimicrobial agents, ammoniating agents, vitamins, desensitizing agents, enzymes, optical brighteners, astringents, perservatives, flavoring agents and colorants; and

II. about 60 to 99% by weight of a dispersing liquid which has a normal boiling point which is at least 10° C. above the solidification point of said binder and below the normal boiling point of said binder and which has a solidification point at least 20° C. below the solidification point of the binder, in which dispersing liquid the binder is substantially insoluble, said dispersing liquid being selected from the group consisting of water and aqueous solutions of lower polyhydric alcohols of 2 to 6 carbon atoms; and

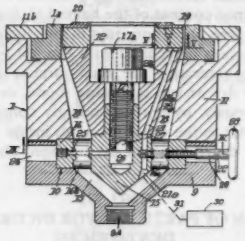
B. cooling such mixture of speckling material and dispersing liquid, while containing agitation thereof, to a temperature below the solidification point of said binder, at which temperature the dispersing liquid remains liquid, to obtain solid dentifrice speckles of the binder and dentifrice component in the dispersing liquid, having substantially uniform shape and sizes in the range of about 0.05 to 1 mm. effective diameter, homogeneously dispersed in said dispersing liquid.

4,003,972

METHOD OF EXTRUDING TUBING FOR FASTENER BAGS

Andre Herz, Nesles-la-Vallee, France, assignor to Minigrip, Inc., Orangeburg, N.Y.

Division of Ser. No. 243,966, April 14, 1972, Pat. No. 3,841,816. This application July 30, 1974, Ser. No. 493,026
Int. Cl.² B29C *17/02*
U.S. Cl. 264—40.3 **13 Claims**



1. The method of making a continuous plastic tube with fastener profiles on the surface thereof for use in making reclosable bags comprising:

extruding a heated thermoplastic material from a die through an annular die slot and thereby forming a tube and concurrently extruding plastic through shaped die profile openings aligned with said die slot and thereby forming mating complementary interlocking rib and groove fastener profiles on the tube surface,

supplying tube plastic to the annular slot through a tube passage,

supplying profile plastic to said fastener profile die openings through a profile passage,

supplying gas into the tube emerging from the die slot to circumferentially control the size of the plastic tube,

controllably varying the rate of plastic supply to the annular slot by increasing or decreasing the speed at which plastic material is forced through the tube passage to the slot to thereby vary the rate at which the tube is extruded,

controllably varying the flow of the gas into the tube relative to the rate of plastic supply to control the increase in tube diameter and to obtain a tube of a predetermined wall thickness and tubing diameter,

and controllably varying by adjustment the rate of plastic supply to said profile openings by restricting the flow of plastic supply through the profile passage so as to supply a tube with controlled variation in diameter and thickness with said profiles thereon of constant and optimum dimensions.

12. The method of making a continuous plastic tube with small critically sized complementary interlocking fastener profiles thereon for use in making reclosable bags, comprising:

extruding a heated thermoplastic material from a die through an annular die slot and thereby forming a tube and concurrently extruding plastic through shaped small critically sized die profile openings and aligned with the slot and thereby forming mating complementary rib and groove fastener profiles on the tube surface;

supplying tube plastic to the annular slot;

supplying profile plastic to said fastener profile die openings;

supplying gas into the tube emerging from the die slot to circumferentially control the size of the plastic tube;

controllably varying by a first control means the rate of flow of plastic supply to the annular slot;

controllably varying by a second control means the rate of flow of profile forming plastic to the shaped profile openings until a small critically sized profile is extruded from said openings;

controllably varying by a third control means the flow of gas to control the diameter of the tube;

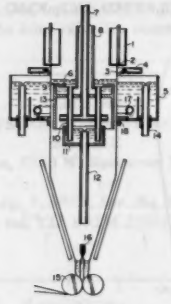
and changing said second control means as a function of the change of the first and third means so that as said first and third means are changed to obtain a tube of different dimensions the second means is changed to maintain the size of profile constant to said critical size.

4,003,973

PROCESS AND APPARATUS FOR PRODUCING SHEET FILM FROM TUBULAR THERMOPLASTIC RESIN FILM

Kazuhiko Kurokawa, and Teruchika Kanou, both of Fuji, Japan, assignors to Kabushiki Kaisha Kohjin, Tokyo, Japan

Filed June 23, 1972, Ser. No. 265,894
Int. Cl.² B29D *7/20*; B29C *25/00*
U.S. Cl. 264—101 **8 Claims**



1. A process for producing a sheet film from a tubular thermoplastic resin film which comprises:

a. extruding a molten tubular film of crystalline thermoplastic resin downwardly through an annular die,

b. passing the outside of said downwardly extruded tubular film into contact with a body of a cooling liquid,

c. introducing cooling liquid into the interior of said downwardly extruded tubular film so that a body of cooling liquid is formed in the interior of said tubular film opposite to the body of cooling liquid contacting the exterior of said tubular film,

d. maintaining the level of the body of cooling liquid on the inside of said tubular film 5 – 15 mm higher than that of the level of the body of cooling liquid on the exterior of the tubular film,

e. flattening the cooled film,

f. providing a lengthwise cut in said tubular film immediately prior to step (e) and permitting the liquid which was used to cool the inside the tubular film to flow out, and

g. removing essentially all liquid from the surfaces of the tubular film after it has been cut and flattened.

4,003,974

CONTINUOUS SPIN-DRAWING PROCESS FOR PREPARING POLYETHYLENE TEREPHTHALATE YARNS

William Amdor Chantry, Kinston, N.C., and Roddy Merl Conrad, Hamm, Germany, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 4, 1975, Ser. No. 565,079
Int. Cl.² D01D 5/08
U.S. Cl. 264—210 F 5 Claims

1. A continuous spin-drawing process for preparaing continuous filament polyethylene terephthalate yarns by a coupled process of extruding, drawing, relaxing and winding up, which comprises heating a freshly-extruded continuous filament polyethylene terephthalate yarn having an HRV of 24 to 28 to a temperature of 75° to 250° C., drawing the yarn to a total denier of 50 to 500 at a draw ratio of 5.2:1 to 6:1, passing the drawn yarn over a draw roll having a temperature of 225° to 250° C., relaxing the yarn at a tension of 0.09 to 0.15 gram per denier and winding up the yarn at a minimum speed of 2,000 yards per minute.

4,003,975

SOLVENT EXTRACTION OF COPPER VALUES USING DIHYDROXY AZOARENES

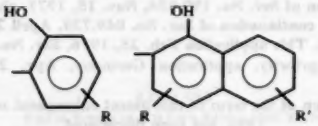
John Frank Tancredi, Yorktown Heights; Patrick Bernard Sullivan, Peekskill, and Glenn Franklin Mitchell, Bedford Hills, all of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 8, 1975, Ser. No. 638,432
Int. Cl.² C22B 15/00
U.S. Cl. 423—24 13 Claims

1. In a process for the recovery of copper values from an aqueous solution of copper and iron values, wherein said aqueous solution is contacted with an immiscible solution of an extracting agent in an organic solvent and the resultant mixture is separated into a barren aqueous phase and a pregnant organic phase and copper values are subsequently recovered from the organic phase by treatment with an aqueous acid solution, the improvement which comprises utilizing as the extracting agent 2,2′-dihydroxy azoarenes having the formula:

Ar - N = N - Ar′

wherein Ar and Ar′ are each selected from the group consisting of



wherein each of R, R′ and R″ is a monovalent radical selected from the group consisting of hydrogen and alkyl groups having 1–20 carbon atoms.

4,003,976

CONVERTER FOR THE PURIFICATION OF EXHAUST GASES

Noboru Komatsu, Toyoake; Osami Kamigaito, Nagoya; Takatoshi Suzuki, Nagoya; Nobuyuki Yamamoto, Nagoya; Haruo Doi, Nagoya; Kazuya Sano, Nagoya; Toshio Kandori, Nagoya, and Yukikazu Tsuzuki, Nagoya, all of Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Japan

Continuation of Ser. No. 455,909, March 28, 1974, abandoned. This application Aug. 29, 1975, Ser. No. 608,912
Claims priority, application Japan, Apr. 3, 1973, 48-37427
Int. Cl.² B01D 53/34
U.S. Cl. 423—213.5 16 Claims

1. A method of reducing NO_x in exhaust gases over a wide range of oxygen ratios while minimizing ammonia formation, which comprises:

1. passing said exhaust gas through a first layer of catalyst having a sintered body structure; said catalyst having a high conversion rate at low oxygen ratios, exhibiting a decrease in conversion rate as the oxygen ratio increases, the causing minimal formation of ammonia; and said catalyst being selected from the group consisting of:
   a. a particulate mixture of nickel oxide and copper oxide;
   b. a particulate mixture of manganese oxide and an oxide selected from the group consisting of cerium oxide, lanthanum oxide, iron oxide, niobium oxide, nickel oxide and mixtures thereof; and
   c. a particulate mixture of cobalt oxide and an oxide selected from the group consisting of yttrium oxide, niobium oxide and mixtures thereof; and
2. thereafter passing said exhaust gas through a second layer of catalyst; said catalyst having a low conversion rate and producing large amounts of ammonia at low oxygen ratios, and exhibiting higher conversion rates while producing lesser amounts of ammonia as the oxygen ratio increases; and said catalyst being selected from the group consisting of:
   d. a platinum-rhodium catalyst;
   e. a platinum catalyst;
   f. a platinum-palladium catalyst; and
   g. a nickel oxide-chromium oxide-copper oxide-iron oxide-barium oxide catalyst.

4,003,977

REMOVAL OF TETRANITROMETHANE FROM TNT PLANT WASTE GASES

William H. Gilligan, Washington, D.C., and Thomas N. Hall, Adelphi, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 18, 1975, Ser. No. 605,778
Int. Cl.² B01D 53/34
U.S. Cl. 423—236 21 Claims

1. A gas scrubbing process for removing tetranitromethane from trinitrotoluene plant waste gases comprising:

scrubbing the waste gases with a two phase mixture comprising (1) an alkali metal hydroxide, (2) water, and (3) a water insoluble solvent selected from the group consisting of (a) ethers, (b) alkyl aromatic compounds, (c) halo aromatic compounds, (d) hydrocarbons, and (e) mixtures thereof;

provided that the two phase mixture is circulated countercurrent to the flow of the waste gases.

4,003,978
METHOD FOR TREATING AMMONIA-CONTAINING GASES

Tatsuo Shiraishi; Shinkichi Shimizu; Hiroshi Ichihashi; Tadashi Shindo, and Fumiyoshi Kato, all of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Oct. 18, 1974, Ser. No. 515,888
Claims priority, application Japan, Oct. 24, 1973, 48-120185; Apr. 25, 1974, 49-47350
Int. Cl.² C01B *21/02*
U.S. Cl. 423—237 6 Claims

1. A method for treating ammonia-containing gases to remove ammonia therefrom by oxidizing the ammonia to nitrogen gas and water in the vapor phase at an elevated temperature in the presence of molecular oxygen and with a substantial reduction in the amount of nitrogen oxides being produced, which comprises contacting the ammonia-containing gases with a metal oxide catalyst of the formula:

$$Cr_xA_yO_z$$

where Cr is chromium; A is at least one element selected from the group consisting of tin, antimony, vanadium, cobalt, silver, zinc, nickel, titanium, molybdenum, tungsten, sulfur, phosphorus, boron, germanium and zirconium; x is a numeral of 4 to 12; y is a numeral of 0.2 to 8 and z is a numeral of 6.2 to 42, at a temperature of 200° to 500° C., and in a molar ratio of oxygen to ammonia of one or more, said catalyst being prepared by kneading a slurry of (a) a chromium compound selected from a group consisting of chromium nitrate, chromium acetate, chromic anhydride, ammonium chromate, potassium chromate, sodium chromate, ammonium bicromate, potassium bichromate and sodium bichromate and (b) one or more members selected from the group consisting of an oxide, nitrate, chromate, carbonate, acetate or hydroxide of nickel, cobalt or zinc, or a complex salt thereof; a trioxide or dioxide of molybednum or tungsten, ammonium molybdate, ammonium tungstate, or a chelate compound thereof with ethanolamine; an oxide of tin, antimony or titanium, tin tetrachloride, tin dichloride, antimony pentachloride, antimony trichloride or titanium tetrachloride; divanadium pentaoxide, divanadium tetraoxide, divanadium trioxide, vanadyl oxalate, vanadyl chloride, a chelate compound thereof with ethanolamine or ammonium metavanadate; silver oxide, silver nitrate, silver chromate, silver bichromate or silver carbonate; sulfuric acid, ammonium sulfate or chromium sulfate; phosphiric acid, phosphorus pentoxide, ammonium phosphate or chromium phosphate; boric acid; germanium dioxide or germanium chloride; and zirconium dioxide, zirconium silicate, zirconium nitrate or zirconium sulfate with a carrier material selected from the group consisting of silica sol and a fine powder selected from silica, diatomaceous earth or alumina together with water, drying the mixed composition so formed at a temperature sufficient to make it substantially anhydrous and calcining said anhydrous composition at a temperature of from 300° to 1,000° C..

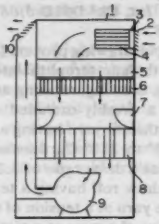
4,003,979
METHOD OF CLEANING AIR CONTAINING CARBON MONOXIDE

Hiroshi Kanno, Amagasaki, Japan, assignor to Kanebo, Ltd., Tokyo, Japan

Filed Nov. 22, 1974, Ser. No. 526,178
Claims priority, application Japan, Nov. 26, 1973, 48-132859; Mar. 19, 1974, 49-32083; Apr. 24, 1974, 49-46800
Int. Cl.² B01D *53/34*
U.S. Cl. 423—239 8 Claims

1. A method for cleaning polluted air containing oxides, nitrogen oxides, organic substances and carbon monoxide wherein the carbon monoxide is oxidized into carbon dioxide, comprising the steps of:

passing the polluted air through two types of filters, one type having a layer of hopcalite or potassium permanganate deposited on active carbon for removing sulfur and nitrogen oxides and the other type being comprised of solid adsorbent selected from the group consisting of active carbon, active alumina, alumina-silica and porous



particles of organic high polymers for removing organic substances and then,

passing the air so treated at ambient temperature through a catalyst layer composed of a noble metal catalyst supported by the active carbon, said catalyst layer containing 20 to 50% by weight, based on the total weight of the noble metal catalyst and the active carbon, of water.

4,003,980
URANIUM DIOXIDE PREPARATION

George W. Watt, Austin, Tex., and Daniel W. Baugh, Jr., Baton Rouge, La., assignors to Exxon Nuclear Company, Inc., Bellevue, Wash.

Filed May 21, 1975, Ser. No. 579,495
Int. Cl.² C01G *43/02*
U.S. Cl. 423—261 15 Claims

1. A process for the preparation of an actinide dioxide comprising reacting a starting material comprising an actinide compound selected from the group consisting of (a) plutonyl nitrate, a hydrate of plutonyl nitrate or a tetrahydrofuranate of plutonyl nitrate, (b) neptunyl nitrate, a hydrate of neptunyl nitrate or a tetrahydrofuranate of neptunyl nitrate and (c) uranyl nitrate, a hydrate of uranyl nitrate or a tetrahydrofuranate of uranyl nitrate with a reactant comprising an alkali or alkaline earth metal adduct of a monocyclic or polycyclic hydrocarbon in the presence of an inert organic solvent.

4,003,981
PROCESS OF MAKING SUPERFINE AMORPHOUS HIGH STRUCTURE SILICIC ACID

Günter Türk, Gross-Auheim, and Joseph Welsch, Neu-Isenburg, both of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Continuation of Ser. No. 290,884, Sept. 21, 1972, which is a continuation of Ser. No. 199,054, Nov. 15, 1971, abandoned, which is a continuation of Ser. No. 849,739, April 28, 1969, abandoned. This application Feb. 25, 1976, Ser. No. 661,166
Claims priority, application Germany, Apr. 27, 1968, 1767332
The portion of the term of this patent subsequent to Jan. 4, 1994, has been disclaimed.
Int. Cl.² C01B *33/18*, *33/14*
U.S. Cl. 423—335 6 Claims

1. An amorphous, high structure, finely divided percipitated silicic acid for use as a carrier for pesticides which is characterized by a malathion absorption, as defined herein, of at least about 316% and which is made by heating an aqueous alkali-metal silicate solution to a temperature between 70° and 100° C, then adding an acid or an acidic-acting substance or a mixture of said acid and acidic-acting substance together with further alkali-metal silicate to the heated solution, thus causing the mixture to pass first through an alkaline phase and then

through an acid precipitation phase, whereby a gradual transition of the silicate to an intermediate hydrated silica sol and thereafter gradual conversion of the hydrated silica sol by flocculation to a silicic acid suspension occurs in said alkaline phase, these steps being carried out with the following provisions:

a. the alkali number of the reaction mixture is maintained substantially constant throughout the said alkaline precipitation phase at a value within the range from 10 to 40:

b. the amounts of components for the precipitation reaction are selected to obtain an SiO_2 end concentration above 65 grams SiO_2 per liter;

c. a dispersing and shearing force is applied to the mixture throughout the major part of the period of said gradual conversion of the intermediate hydrated silica sol to the flocculated silicic acid;

d. the said dispersing and shearing force is applied by passing the mixture in a continuous stream through a flow-through dispersing pump, centrifugal pump, or combination of these devices, the said pump operating at a frequency of at least 10 per hour, the said frequency being the ratio of the performance of the dispersing device expressed in cubic meters per hour to the initial volume of the reaction mixture in cubic meters; and

e. the said mixing, precipitation and suspension formation is carried out in a single reaction vessel.

4,003,982

SAFE METHOD FOR THERMAL DECOMPOSITION OF NITROGEN TRICHLORIDE

Howard W. Hill, Sea Ranch, and Ronald E. Hassall, Antioch, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 30, 1975, Ser. No. 573,224
Int. Cl.² C01B *21/02, 7/03*
U.S. Cl. 423—351 **13 Claims**

1. The process for decomposing nitrogen trichloride to nitrogen and chlorine which comprises heating a solution of not more than about 3.5 weight percent NCl_3 in an inert solvent, under at least autogenous pressure, to a temperature within the range of from about 105° C. to that resulting in an autogenous pressure of 300 psig.

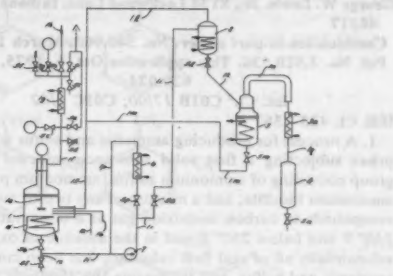
4,003,983

PROCESS OF PREPARING DICYAN

Johannes Heilos, Seligenstadt; Werner Heimberger, Hanau am Main; Theodor Lussling, Grossauheim, and Wolfgang Weigert, Offenbach (Main), all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Continuation of Ser. No. 124,866, March 16, 1971, abandoned. This application Jan. 23, 1975, Ser. No. 543,367
Claims priority, application Germany, Mar. 17, 1970, 2012509; May 8, 1970, 2022454; May 8, 1970, 2022455
Int. Cl.² C01C *3/00*
U.S. Cl. 423—384 **7 Claims**

1. A process for the production of cyanogen which comprises reacting hydrogen cyanide with hydrogen peroxide at a temperature between 0° and 100° C in the presence of ferric



ions and a copper salt selected from the group consisting of copper(II) bromide, chloride, cyanide, nitrate, and sulfate.

4,003,984

PRODUCTION OF SULFURYL FLUORIDE

Edward Stephen Jones, Williamsville; Martin Alvin Robinson, East Amherst, and Richard Elmer Eibeck, Orchard Park, all of N.Y., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Oct. 2, 1975, Ser. No. 619,103
Int. Cl.² C01B *17/45*
U.S. Cl. 423—468 **9 Claims**

1. A process for producing sulfuryl fluoride which comprises introducing a substantially anhydrous gaseous mixture of chlorine, sulfur dioxide and hydrogen fluoride into a reaction zone in which there is present an alkaline earth metal fluoride catalyst, maintaining the temperature in the reaction zone between about 125° C and 400° C, and recovering the sulfuryl fluoride produced.

4,003,985

PRODUCTION OF SODIUM SULFITE

Robert Joel Hoffman, Liverpool; Samuel Louis Bean, Jamesville; Philip Seeling, North Syracuse, and James William Swaine, Jr., Manlius, all of N.Y., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Jan. 30, 1976, Ser. No. 653,876
Int. Cl.² C01D *5/14*
U.S. Cl. 423—512 A **11 Claims**

1. The method of producing anhydrous sodium sulfite comprising:

a. forming a saturated aqueous solution of sodium sulfite containing less than about 3 ppm of dissolved iron, basis the solution, and adjusting the pH of said solution to within the range of from about 6.5 to about 7.6;

b. introducing into said solution substantially anhydrous sodium carbonate concurrently with a sulfur dioxide-containing gas stream, so proportioned with respect to each other as to maintain the pH of said solution within the range of from about 6.5 to about 7.6, while maintaining the temperature of said solution above about 35° C. to form a slurry of anhydrous sodium sulfite crystals; and

c. withdrawing anhydrous sodium sulfite crystals from said slurry.

4,003,986

PROCESS FOR PRODUCING SULFUR FROM SULFUR DIOXIDE OR AMMONIUM SULFITES

George W. Lewis, Jr., 8138 Lockwood Lane, Indianapolis, Ind. 46217

Continuation-in-part of Ser. No. 340,963, March 14, 1973, Pat. No. 3,928,536. This application Oct. 6, 1975, Ser. No. 620,024

Int. Cl.² C01B 17/00; C01C 1/02

U.S. Cl. 423—567 A 6 Claims

1. A process for producing ammonia and sulfur which comprises subjecting a first solid substance selected from the group consisting of ammonium sulfite, ammonium pyrosulfite, ammonium bisulfite, and a mixture of any two or more of said compounds to carbon monoxide gas at a temperature above 140° F and below 250° F and in the absence of oxygen until substantially all of said first substance has been converted to ammonia and sulfur, and recovering the ammonia and sulfur produced.

4,003,987

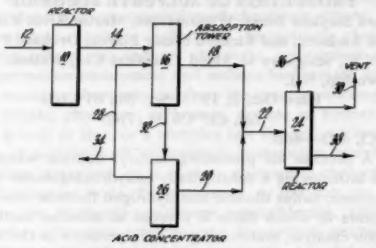
WASTE STREAM TREATMENT

Peter L. Paull, Weston, Conn., and James M. Caffrey, Jr., Wappingers Falls, N.Y., assignors to Texaco Development Corporation, New York, N.Y.

Filed June 30, 1975, Ser. No. 591,744

Int. Cl.² C01B 17/04, 17/00, 17/82

U.S. Cl. 423—570 6 Claims



1. In the continuous formation of carbon dioxide, nitrogen, concentrated sulfuric acid and sulfur from an industrial flue gas comprising nitrogen oxides, sulfur dioxide and oxygen, the steps that comprise:

a. contacting at between about 300° and 350° F. said flue gas with a first oxidation catalyst selected from an oxide of a Group Ib, VIa, VIIa or VIII metal of the Periodic Table or an oxide of vanadium at a space velocity of between about 500 and 10,000 volumes of said flue gas/volume of said first catalyst to effect conversion substantially of all the nitrogen oxide in said nitrogen oxides to nitrogen dioxide and to effect conversion of only a part of the sulfur dioxide in said flue gas to sulfur trioxide.

b. admixing the oxidized flue gas with between about 70 and 90 wt. % aqueous sulfuric acid to effect adsorption in said sulfuric acid of the nitrogen dioxide in said industrial flue gas and the nitrogen dioxide formed in said step *a* resulting in the formation of nitrosyl sulfuric acid therein by the reaction of said nitrogen dioxide with sulfuric acid,

c. separating the resultant sulfuric acid phase and unabsorbed flue gas phase comprising sulfur dioxide resulting from step *b*,

d. heating said sulfuric acid phase separated in step *c* at between about 300 and 500° F. to remove nitrogen oxides, desorbed sulfur dioxide and water as overhead resulting in a sulfuric acid phase of increased sulfuric acid content and recycling at least a portion of the resultant concentrated sulfuric acid phase to step *b* to be employed as at least a part of said sulfuric acid,

e. combining the overhead formed in step *d* with the separated unabsorbed flue gas phase of step *c*, and

f. treating at a temperature between about 300° and 450° F. the combined unabsorbed flue gas phase and overhead of step *e* with carbon monoxide in the presence of a second oxidation catalyst selected from an oxide of Group Ib, VIa, VIIa or VIII metal of the Periodic Table or an oxide of vanadium employing a space velocity of between about 500 and 10,000 volumes of said flue gas/volume of said second oxidation catalyst to yield nitrogen, carbon dioxide and sulfur and separating said nitrogen and carbon dioxide from said sulfur.

4,003,988

DIRECT AGGLUTINATION TEST FOR PREGNANCY

Gail Hoff, Millington, and Metka Prevorsek, Morristown, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed June 1, 1976, Ser. No. 691,915

Int. Cl.² G01N 31/02, 33/16

U.S. Cl. 424—12 9 Claims

1. A liquid reagent having the characteristics of agglutination when placed in contact with fluids which contain human chorionic gonadotropin and which comprises a polymeric latex carrier having a particle size between about 0.15 to about 0.9 microns, said carrier being coated with rabbit anti-human chorionic gonadotropin serum and the reagent being buffered to a pH of from 5.0 to about 8.6 with a buffer which comprises about 0.005 to about 1.0M piperazine dihydrochloride, water and sufficient sodium hydroxide to obtain the buffered pH.

4,003,989

PHARMACEUTICAL PREPARATION

Ernest Bar-On, 3 Pasternak St., Tel-Aviv, Israel

Filed Apr. 24, 1975, Ser. No. 571,430

Claims priority, application Israel, May 6, 1974, 44774

Int. Cl.² A61K 9/00, 31/60, 31/265

U.S. Cl. 424—43 12 Claims

1. A pharmaceutical preparation in unit dosage form for oral ingestion after dissolution in a suitable liquid, said pharmaceutical preparation comprising in combination sodium salicylate and a quantity of 5 to 100 times by weight thereof of dry milk solids.

4,003,990

ANTI-INFLAMMATORY POLYMERS, PHARMACEUTICAL COMPOSITIONS CONTAINING THE SAME AND PROCESS FOR PRODUCING SAID POLYMERS

Bernard Jacquet, Antony; Christos Papantoniou, Epinay-sur-Seine; Pierre Dufaure, and Claude Mahieux, both of Paris, all of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

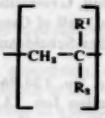
Division of Ser. No. 374,060, June 27, 1973, Pat. No. 3,946,035. This application Nov. 7, 1975, Ser. No. 629,928

Claims priority, application Luxembourg, June 29, 1972, 65621; June 29, 1972, 65622

Int. Cl.² A61K 31/74

U.S. Cl. 424—78 9 Claims

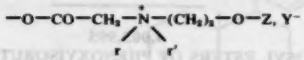
1. A pharmaceutical composition comprising a pharmaceutically acceptable excipient and at least one anti-inflammatory polymer containing repeating units of the formula



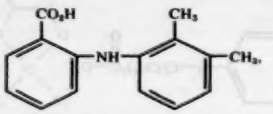
wherein R^1 and R_2 are selected from the group of values consisting of

a. R_2 is $+O-CO-CH-_{R_3}]_nO-Z$, R^1 is hydrogen and n is 1–10,

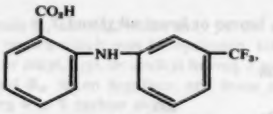
b. R_2 is $-CH_2-O-CO-CH_2-o-Z$ and R^1 is hydrogen or methyl,
c. R_2 is $-CH_2-NH-CO-CH_2O-Z$ and R^1 is hydrogen,
d. R_2 is $-CO-NH-CH_2-NH-CO-CH_2-O-Z$ and R^1 is hydrogen, and
e. R_2 is



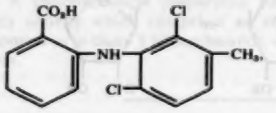
wherein r and r' represent alkyl having 1–3 carbon atoms, Y represents chlorine or bromine, and R^1 is hydrogen or methyl, and Z is the acyl residue of an anti-inflammatory carboxylic pharmaceutical agent selected from the group consisting of



(1)



(2)



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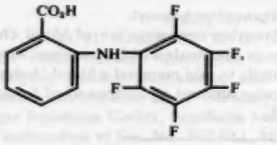

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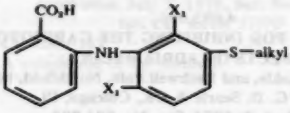
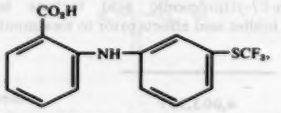


(5)

wherein
X_1 represents Cl, Br, F or I and said alkyl has 1–3 carbon atoms,



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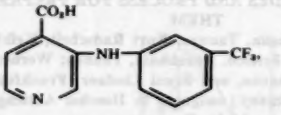
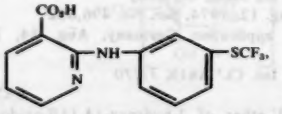


(7)



(8)

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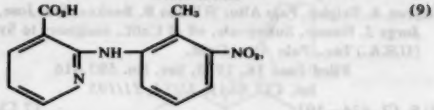
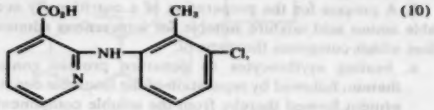


(9)



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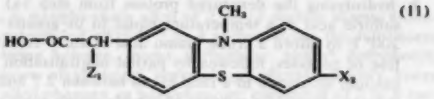
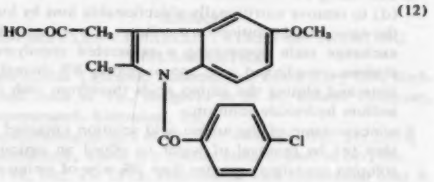


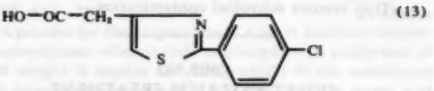
(11)

wherein Z_1 is selected from the group consisting of hydrogen and methyl, and X_2 is selected from the group consisting of hydrogen and methoxy,



(12)

and



(13)

said anti-inflammatory polymer being present in a sufficient amount effective to produce a delayed and prolonged action of the residue of said anti-inflammatory carboxylic pharmaceutical agent.

4,003,991

OPHTHALMIC FORMULATION

David L. Krohn, New York, N.Y., and Samuel H. Ronel, Princeton, N.J., assignors to National Patent Development Corporation, New York, N.Y.

Filed Aug. 27, 1974, Ser. No. 501,117
Int. Cl.[2] A61K *31/74, 31/78, 31/415*
U.S. Cl. 424—81 **34 Claims**

1. A viscous, homogeneous opthalmic formulation comprising
1. water,
2. a therapeutically effective amount of a medicament, and
3. a solid, compatible, non-toxic polymer which is a water-soluble acrylic polymer, a water-soluble 2-alkenamide polymer or a water-soluble ethylenimine polymer, the concentration of said polymer being sufficient to impart to the formulation a slow-flowing characteristic which is substantially shape-retaining as said formulation is initially forced from a tube under mild hand squeezing of the tube.

4,003,992

HYDROLYTIC PROCESS FOR THE PREPARATION OF AMINO ACIDS

Myron A. Beigler, Palo Alto; William B. Benken, San Jose, and Jorge J. Nassar, Sunnyvale, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed June 16, 1975, Ser. No. 587,016
Int. Cl.² A61K *35/14, 31/195*
U.S. Cl. 424—101 17 Claims

1. A process for the preparation of a nutritionally acceptable amino acid mixture suitable for intravenous administration which comprises the steps of:

a. heating erythrocytes to denature protein contained therein, followed by separation of the insoluble denatured protein formed thereby from the soluble components;

b. hydrolyzing the denatured protein from step (a) with sulfuric acid at a temperature equal to or greater than 200° F to afford a crude amino acid mixture essentially free of peptides, followed by partial neutralization with calcium hydroxide to a final pH of between 2.7 and 3.5, thereby affording a mixture of soluble amino acids and a cake comprising calcium sulfate and humin impurities;

c. desludging the mixture formed in step (b) by separating the amino acid solution from the calcium sulfate-humin cake;

d. decolorizing the amino acid solution obtained from step (c);

e. deionizing the decolorized amino acid solution from step (d) to remove nutritionally objectionable ions by loading the amino acid solution on a column of a strong cationic exchange resin comprising a sulfonated copolymer of styrene cross-linked with approximately 8% divinyl benzene and eluting the amino acids therefrom with dilute sodium hydroxide solution;

f. concentration of the amino acid solution obtained from step (e) by removal of water to afford an amino acid solution containing greater than 2% w/w of amino acids; and

g. sterilization of the amino acid solution obtained from step (f) to remove microbial contamination.

4,003,993

PIGLET ENTERITIS TREATMENT

Knud Rorvig, Gentofte, Denmark, assignor to Biofac A/S, Copenhagen, Denmark

Filed Dec. 15, 1970, Ser. No. 98,479
Claims priority, application Switzerland, Dec. 15, 1969, 18597/69
Int. Cl.² A61K *35/38*
U.S. Cl. 424—104 14 Claims

1. A therapeutic composition useful in the treatment of piglet enteritis which comprises an extract obtained from the contents of at least a portion of that section of the digestive system of a ruminant consisting of the rumen and the section of the alimentary canal immediately successive to the rumen, said extract being prepared by mixing said contents with water, using one to two parts water per two parts of said contents, filtering the mixture, and in arbitrary succession sterilizing by heating and concentrating the filtrate by evaporation to obtain a concentrated extract.

4,003,994

COPPER-ALKALINE EARTH METAL FUNGICIDAL COMPOSITIONS

John D. Downer, and Clarence A. L. Phillips, both of Trinidad, British West Indies, assignors to Texaco Trinidad, Inc., Trinidad, British West Indies

Continuation-in-part of Ser. No. 360,504, May 15, 1973, abandoned. This application Nov. 4, 1974, Ser. No. 520,512
Int. Cl.² A01N *11/00, 9/00*
U.S. Cl. 424—157 6 Claims

1. A fungicidal composition in the form of a micelle, said micelle comprising an outer protective layer consisting of the overbased copper-alkaline earth metal naphthenates of naphthenic acids having a molecular weight in the range of about 200 to about 600, and an inner core consisting mainly of copper hydroxide, the ratio of equivalents of copper to naphthenate ranging from about 1 to about 20, the mole percent ratio of said alkaline earth metal to copper being from 1 to 8.

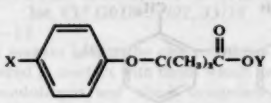
4,003,995

GLYCOSYL ESTERS OF PHENOXYISOBUTYRIC ACIDS

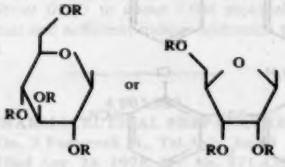
Sumanas Rakhit, Dollard des Ormeaux, Canada, assignor to American Home Products Corporation, New York, N.Y.

Filed Jan. 2, 1976, Ser. No. 646,210
Int. Cl.² A61K *31/70*
U.S. Cl. 424—180 6 Claims

1. A compound of formula 1



in which X is chloro, bromo or lower alkyl and Y is



wherein R is lower alkanoyl or benzoyl.

3. A method for lowering concentration of blood cholesterol and triglycerides in mammals which comprises administering orally or parentally to said mammal a blood cholesterol and triglyceride lowering amount of compound of formula 1 as claimed in claim 1.

4,003,996

SPIROLACTONE FOR INHIBITING THE CARDIOTOXIC EFFECTS OF ADRIAMYCIN

Raphael Pappo, Skokie, and Rothwell Polk, Northfield, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Sept. 9, 1974, Ser. No. 504,095
Int. Cl.² A61K *31/71*
U.S. Cl. 424—181 1 Claim

1. A method for inhibiting the cardiotoxic effects of adriamycin in an animal which comprises pretreating said animal with the aldosterone inhibitor 3-(3-oxo-7α-acetylthio-17β-hydroxyandrost-4-en-17-yl)propionic acid lactone in an amount sufficient to inhibit said effects prior to treatment with adriamycin.

4,003,997

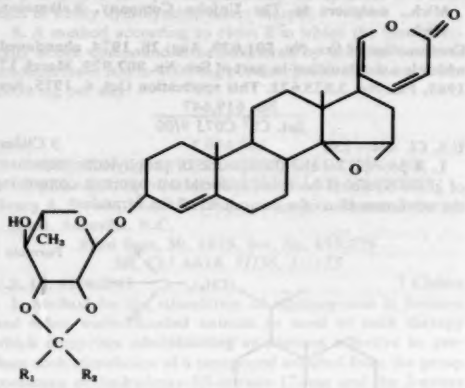
HEART GLYCOSIDES AND PROCESS FOR PREPARING THEM

Ulrich Stache, Hofheim, Taunus; Kurt Radscheit, Kelkheim, Taunus; Werner Fritsch, Neuenhain, Taunus; Werner Haede, Hofheim, Taunus, and Ernst Lindner, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 12, 1974, Ser. No. 496,892
Claims priority, application Germany, Aug. 14, 1973, 2341023
Int. Cl.² A61K *31/70*
U.S. Cl. 424—182 8 Claims

1. A cyclic 2',3'-ether of 3-hydroxy-14,15β-oxido-14β-

bufa-4,20,22-trienolide, 3β-(α-L-rhamnopyranoside) of the formula



wherein R_1 and R_2, which may be the same or different but only one of which may be hydrogen, taken alone, are hydrogen, or alkyl, aryl, or aralkyl having 1 to 7 carbon atoms, and R_1 and R_2, taken together, are linear or branched alkylene having 4 to 9 carbon atoms.

7. A pharmaceutical preparation having cardiac insufficiency activity which comprises an effective amount of a compound as in claim 1 in combination with a pharmaceutical carrier.

4,003,998

α-ACYL DERIVATIVES OF DIGITOXIN

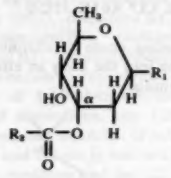
Walter Losel; Herbert Merz, both of Ingelheim am Rhein; Wolfgang Hoefke, Budenheim, and Werner Traunecker, Munster-Sarmsheim, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Continuation of Ser. No. 362,911, May 23, 1973. This application July 7, 1975, Ser. No. 593,800

Int. Cl.² A61K *31/70*

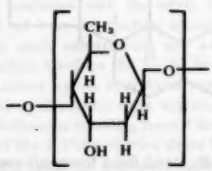
U.S. Cl. 424—182 **10 Claims**

1. A compound of the formula



(I)

wherein R_1 is



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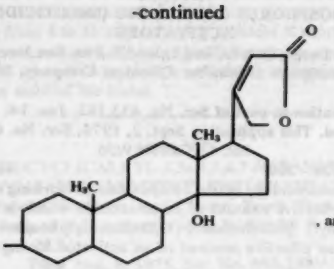


, and

R_2 is straight-chain alkyl of 2 to 15 carbon atoms; monosubstituted alkyl of 1 to 4 carbon atoms the substituent being halogen, cyano, carbethoxy, phenyl, halophenyl, lower alkyl-phenyl, lower alkoxy-phenyl; phenoxy, lower alkyl-phenoxy or halo-phenoxy; cycloalkyl of 3 to 6 carbon atoms; cycloalkyl of 3 to 6 carbon atoms-methyl; or N-trifluoromethylcarbonyl-aminoethyl.

9. A cardiotonic pharmacutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective cardiotonic amount of a compound of claim 1.

4,003,999

ASPIRIN-TEA COPRECIPITATES FOR TREATING INFLAMMATION

Robert Archie Lybrand, Ashland, and Louis Gary Bell, Richmond, both of Va., assignors to A. H. Robins Company, Incorporated, Richmond, Va.

Continuation-in-part of Ser. No. 404,945, Oct. 10, 1973, abandoned, which is a continuation-in-part of Ser. No. 300,796, Oct. 25, 1972, abandoned. This application May 8, 1975, Ser. No. 575,898

Int. Cl.² A61K *31/60, 35/78*

U.S. Cl. 424—195 **24 Claims**

1. A process for the preparation of a water insoluble aspirin-tea coprecipitate wherein said coprecipitate is comprised of 85–98 weight % aspirin and 2–15 weight % tea constituent which comprises mixing aspirin, tea and a base in water, said base being an amount to form a soluble acetyl salicylate, the resulting solution containing from about 2 to about 7 weight % acetyl salicylate and from about 0.3 to about 3.5 weight % tea, acidifying the solution at a temperature of from about −2° to about 25° C. and to a pH of from about 4.2 to about 2.6 to cause formation of the coprecipitate and recovering the coprecipitate.

4,004,000

SELF-LIMITING CHEMICAL SYSTEMS FOR NONPOLLUTING CONTROL OF NOXIOUS PESTS

Robert T. Kemp, Jr., Asheville, N.C., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 8, 1975, Ser. No. 594,409

Int. Cl.² A01N *9/36*

U.S. Cl. 424—200 **10 Claims**

1. A method of controlling insects comprising applying to the locus of said insects an insecticidally effective amount of a non-polluting insecticidal principle formed by

spraying a first relatively non-toxic, stable reactant, trimethyl phosphite, from one nozzle; and

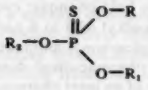
spraying a second non-toxic, stable reactant selected from the group consisting of chloral, 3,5-diphenyl-N-(trichloroacetyl) pyrazole, and N(trichloroacetyl) pyrazole from a second nozzle, so as to cause said first and said second reactants to combine to form a non-stable insecticidal principal.

4,004,001
PHOSPHORUS CONTAINING INSECTICIDE ACTIVATORS

George B. Large, Orinda, and Leland S. Pitt, San Jose, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Continuation-in-part of Ser. No. 433,182, Jan. 14, 1974, abandoned. This application Sept. 2, 1975, Ser. No. 609,865
Int. Cl.² A01N 9/36
U.S. Cl. 424—200 41 Claims

1. An insecticidally active composition comprising an insecticidally effective amount of an insecticide which is N-(mercaptomethyl) phthalimide-S-(O,O-dimethylphosphorodithioate) and an effective amount of an activator having the formula



wherein R is selected from the group consisting of methyl, ethyl, n-propyl, i-propyl and i-butyl; R_1 is selected from the group consisting of methyl, ethyl, n-propyl, i-propyl, n-butyl and i-butyl and R_2 is selected from the group consisting of phenyl, substituted phenyl wherein said substituents are selected from the group consisting of methyl, ethyl, i-propyl, t-butyl, methoxy, ethoxy, and dimethylamino; phenalkyl and substituted phenalkyl wherein said substituents are selected from the group consisting of chlorine, methyl, i-propyl and methoxy, said activator being present in an amount ranging between 0.1 and 10.0 parts by weight per each part by weight insecticide and being effective to increase the activity of the insecticide.

4,004,002
ANTI-INFLAMMATORY AGENTS COPRECIPITATED WITH LIGNO-SULFONIC ACID

Robert Archie Lybrand, Ashland, and Louis Gary Bell, Richmond, both of Va., assignors to A. H. Robins Company, Incorporated, Richmond, Va.

Continuation-in-part of Ser. No. 459,828, April 10, 1974, abandoned, which is a continuation-in-part of Ser. Nos. 271,986, July 14, 1972, abandoned, and Ser. No. 89,999, Nov. 16, 1970, abandoned. This application Nov. 3, 1975, Ser. No. 628,258
Int. Cl.² A61K 31/60
U.S. Cl. 424—230 19 Claims

1. A water insoluble anti-inflammatory coprecipitate of a lignosulfonic acid and an anti-inflammatory agent selected from the group consisting of aspirin, phenylbutazone and indomethacin wherein the amount of said lignosulfonic acid in the coprecipitate varies from 3 to 10 weight % and the amount of anti-inflammatory agent in the coprecipitate varies from 90–97 weight %, said coprecipitate formed by acidifying an aqueous solution of said lignosulfonic acid and the anti-inflammatory agent, said aqueous solution being substantially free of undissolved solids prior to acidification and said solution formed by mixing said lignosulfonic acid or an aqueous solution thereof and an aqueous solution formed by solubilizing said anti-inflammatory agent with a base.

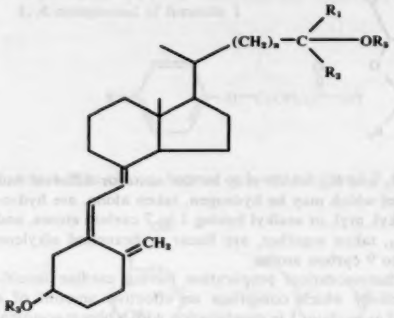
4,004,003
25-HYDROXYCALCIFEROL COMPOUNDS FOR TREATMENT OF STEROID-INDUCED OSTEOPOROSIS

John C. Babcock, and J. Allan Campbell, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 501,039, Aug. 28, 1974, abandoned, which is a continuation-in-part of Ser. No. 807,929, March 17, 1969, Pat. No. 3,833,622. This application Oct. 6, 1975, Ser. No. 619,647
Int. Cl.² C07J 9/00
U.S. Cl. 424—238 3 Claims

1. A process for the therapeutic or prophylactic treatment of gluco-corticoid hormone-induced osteoporosis comprising the administration of a compound of the formula:

Formula I



wherein R_1 and R_2 are the same or different radicals selected from the group consisting of hydrogen, alkyl of less than 9 carbon atoms, and phenyl; R_3 and R_5 are selected from the group consisting of hydrogen and lower acyl; *n* is an integer, selected from the group consisting of 2, 3, and 4; or a hydrate thereof in association with a pharmaceutical carrier to a human or animal.

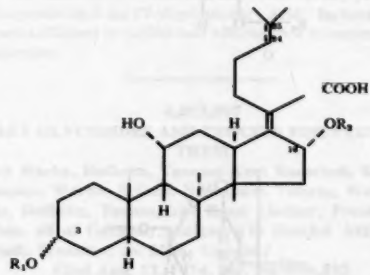
4,004,004
FUSIDIC ACID DERIVATIVES

Welf von Daehne, Rungsted Kyst, Denmark, assignor to Leo Pharmaceutical Products Ltd. A/S, Ballerup, Denmark

Filed Aug. 12, 1975, Ser. No. 604,083
Claims priority, application United Kingdom, Sept. 12, 1974, 39891/74
Int. Cl.² A61K 31/56
U.S. Cl. 424—238 10 Claims

8. A method of treating acute or chronic arthritis which comprises administering into the body an effective amount of a compound of the formula:

I



in which R_1 and R_2 stand for a lower alkanoyl radical having from 2 to 8 carbon atoms, a mono- or bicyclic, carbocyclic aryl-lower alkanoyl radical, or a mono- or bicyclic, carbocy-

clic aroyl radical; and R_2 also stands for hydrogen; the dotted line between C-24 and C-25 indicates a double bond or a single bond; and the wavy line at C-3 indicates that OR_1 is α- or β-oriented; and pharmaceutically acceptable, non-toxic salts or easily hydrolyzable esters thereof.

9. A method according to claim 8 in which the therapeutically active compound is administered by the oral route, in amounts from 200 to 4000 mg per day, preferably from 500 to 2000 mg per day.

4,004,005

STEROIDAL ERYTHROPOIETIC AGENTS AND THERAPEUTIC COMPOSITIONS AND METHODS

Henry A. Strade, Montville, N.J., assignor to Akzona Incorporated, Asheville, N.C.

Filed Sept. 30, 1975, Ser. No. 618,176
Int. Cl.² A61K *31/56, 31/575*
U.S. Cl. 424—243 **7 Claims**

1. Method for the stimulation of erythropoesis in humans and other warm-blooded animals in need of such therapy which comprises administering an amount effective to produce such stimulation of a compound selected from the group consisting of 3α-hydroxy-5β-estrane-17-one and the 3-esters of organic carboxylic acids and 3-ethers thereof in which the ether group is selected from the group consisting of methoxy, ethoxy, propoxy, benzyloxy and phenylethoxy.

4,004,006

CONTRACEPTIVE AND ANTIVENEREAL AGENTS

Albert Shulman, and Glenda Maud Shulman, both of Flat 2, 1 Muntz St., North Caulfield, Australia (3161)

Filed Nov. 12, 1974, Ser. No. 523,172
Claims priority, application Australia, Nov. 12, 1973, 5608/73
Int. Cl.² A61K *31/555*
U.S. Cl. 424—245 **28 Claims**

1. A method of inactivating spermatozoa and killing the microorganisms *Neisseria gonorrhea* and Treponema pallidum comprising contacting the same with a pharmaceutically acceptable carrier containing a effective, contraceptive and antivenereal amount of a metal chelate contraceptive and antiveneral agent selected from the group consisting of

$(M\ B_3)\ X_n$ and $(M\ B_2)\ X_n$

wherein M represents a metal selected from ferrous (iron(II)), zinc(II), manganous (manganese(II)), cobaltous (cobalt (II)), cobaltic(cobalt(III)), cuprous(copper(I)), cupric(copper-(II)), nickelous(nickel(II)), chromous (chromium (II)), chromic (chromium (III)), cadmium(II), ruthenous(ruthenium-(II)), osmous(osmium(II)), platinous(platinum(II)), palladous(palladium(II)), rhodic(rhodium (III)) and iridous-(iridium(III)), wherein B represents a ligand provided by a base consisting of 1,10-phenanthroline, 2,2′-bipyridine or their substituted derivatives, the 1,10-phenanthroline base having substituents and mixtures of substituents selected from alkyl, aryl, nitro and chloro in one to eight of the 2-, 3-, 4-, 5-, 6-, 7-, 8-, and 9-, positions and the 2,2′-bipyridine base having substituents selected from alkyl, aryl, nitro and chloro in one to six of the 4-, 5-, 6-, 4′-, 5′-, and 6′- positions, in the case of 1,10-phenanthroline the substitution being in one to eight of the specified positions with the alkyl group and in one or two of the specified positions with the nitro, chloro, aryl, each alkyl substituent of 1 to 16 carbon atoms, the total of all carbon atoms in such substituents not exceeding 16, and where di-substitution involves the 3-, 4-, and 7-, 8-, positions either pairs of carbon atoms may form part of 5-membered and 6-membered cycloalkane ring systems and such aryl, mono- and di-substituents totalling from 4 to 16 carbon atoms, and in the case of the 2,2′-bipyridine there being substitution in one to six of the specified positions with the alkyl groups, and mono-substitution and di-substitution in the 4- and 4′- and 5- and 5′-positions with the nitro, chloro, aryl each alkyl substituent of 1 to 16 carbon atoms, the total of all carbon atoms in such substituents not exceeding 16, and such aryl, totalling from 4 to 16 carbon atoms; wherein X represents the anion of pharmaceutically acceptable inorganic and organic acids; and wherein n represents an integer determined by the oxidation state of the metal.

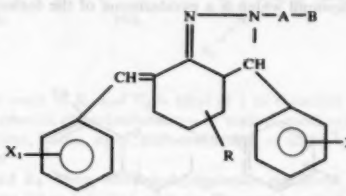
4,004,007

2-HETEROCYCLICALKYL-3,3a,4,5,6,7-HEXAHYDRO-3-PHENYL-7-(PHENYLMETHYLENE)-2H-INDAZOLES

John Krapcho, Somerset, and Chester Frank Turk, Kendall Park, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Aug. 8, 1975, Ser. No. 603,222
Int. Cl.² C07D *487/02;* **A61K** *31/395*
U.S. Cl. 424—246 **15 Claims**

1. A compound of the formula



wherein X_1 and X_2 are the same or different and are selected from the group consisting of hydrogen, F, Cl, lower alkyl, lower alkoxy, or CF_3; R is selected from the group consisting of hydrogen or lower alkyl, A is a straight or branched chain alkylene group of from 2 to about 8 carbons, and B is a 5-, 6-, or 7-membered heterocyclic ring selected from the group consisting of piperidinyl, homopiperidinyl, pyrrolidinyl, morpholinyl, thiamorpholinyl, piperazinyl, N-lower alkylpiperazinyl and N-hydroxy-lower alkylpiperazinyl; and N-oxides and pharmaceutically acceptable acid addition salts thereof.

15. A method of treating inflammation in mammalian species, which comprises administering to a mammalian host a therapeutic amount of a compound as defined in claim 1.

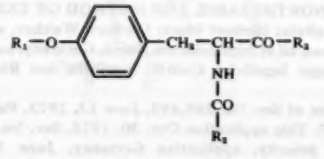
4,004,008

O-TERTIARY AMINO-ALKYL-N-BENZOYL TYROSIL AMIDES

Francesco Makovec, Taccona (Milan); Luigi Rovati, San Fruttuoso di Monza (Milan), and Paolo Senin, Monza (Milan), all of Italy, assignors to Rotta Research Laboratorium S.p.A., San Fruttuoso di Monza (Milan), Italy

Filed Feb. 3, 1975, Ser. No. 546,481
Claims priority, application Italy, Feb. 1, 1974, 67286/74
Int. Cl.² C07D *295/12*
U.S. Cl. 424—248.54 **11 Claims**

1. A tyrosine compound of the formula:



wherein: R_1 is linear or branched chain alkyl of 2–5 carbon atoms terminated by a tertiary amino group, wherein the tertiary amino group is dimethylamino, diethylamino, di-n-propylamino, di-isopropylamino, di-isobutylamino, methylethylamino, pyrrolidino, piperidino or N- substituted piperazino wherein the substituent is methyl, 2-Hydroxyethyl or

benzyl; R_2 is phenyl, mono or di-substituted phenyl, wherein the substituents are -cl, -Br, $-NO_2$,$-OCH_3$, $-CH_3$ or $-CF_3$; R_3 is a monoalkylamino group of 1–6 carbon atoms, dialkylamino of 2 to 8 carbon atoms, pyrrolidino, piperidino or morpholino; or the pharmaceutically acceptable acid addition salts thereof.

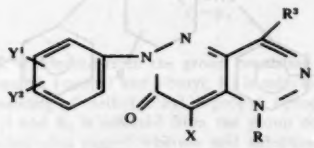
4,004,009

ANTIHYPERTENSIVE ARYL PYRAZOLO[4,3-c]PYRIDAZINONES

Paul L. Anderson, Dover, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed July 31, 1975, Ser. No. 600,885
Int. Cl.² A61K *31/50;* **C07D** *487/04*
U.S. Cl. 424—250 **15 Claims**

1. A compound which is a pyridazinone of the formula:



wherein

X is a hydrogen atom, fluoro or chloro;

Y^1 and Y^2 are the same or different and are selected from the group consisting of a hydrogen atom, alkyl having from 1 to 4 carbon atoms, fluoro, chloro, bromo, trifluoromethyl, and alkoxy having from 1 to 4 carbon atoms, provided that when both Y^1 and Y^2 are trifluoromethyl or branched alkyl, they are not on adjacent carbon atoms;

R is a hydrogen atom or alkyl having from 1 to 3 carbon atoms; and

R^3 is a hydrogen atom or alkyl having from 1 to 4 carbon atoms; or a pharmaceutically acceptable acid addition salt thereof.

13. A method of treating hypertension in a mammal in need of such treatment comprising internally administering a compound of claim 1, in an amount effective in reducing hypertension, to said mammal.

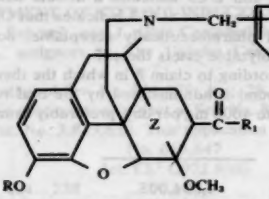
4,004,010

PHARMACEUTICAL COMPOSITIONS CONTAINING AN N-(FURYL-METHYL)-7α-ACYL-6,14-(ENDOETHENO OR ENDOETHANO)-TETRAHYDRO-NORORIPAVINE OR -NORTHEBAINE AND METHOD OF USE

Adolf Langbein; Herbert Merz; Gerhard Walther, and Klaus Stockhaus, all of Ingelheim am Rhein, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Division of Ser. No. 369,499, June 13, 1973, Pat. No. 3,931,187. This application Oct. 30, 1975, Ser. No. 627,286
Claims priority, application Germany, June 19, 1972, 2229770
Int. Cl.² A61K *31/485*
U.S. Cl. 424—260 **10 Claims**

1. An analgesic or antitussive pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective analgesic or antitussive amount of a compound of the formula



wherein

R is hydrogen, methyl or acetyl,

R_1 is methyl, phenyl or hydrogen,

Z is —CH=CH— or $—CH_2—CH_2—$, and

R_3 is hydrogen or methyl,

or a non-toxic, pharmacologically acceptable acid addition salt thereof.

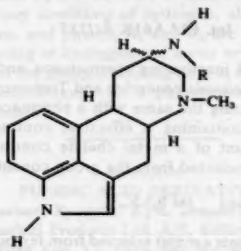
4,004,011

3-PYRIDYLAMINE SUBSTITUTED ERGOLINES

Hartmut Hauth, Riehen, and Hans Tscherter, Neuallschwil, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Filed Apr. 9, 1975, Ser. No. 566,355
Claims priority, application Switzerland, Apr. 16, 1974, 5234/74; Feb. 14, 1975, 1893/75; Feb. 14, 1975, 1894/75
Int. Cl.² C07D *457/12*
U.S. Cl. 424—261 **40 Claims**

1. A compound of formula I:



I

wherein R is 3-pyridyl or 3-pyridyl mono- or di-substituted by lower alkyl having 1 to 4 carbon atoms, lower alkoxy having 1 to 4 carbon atoms, lower alkylthio having 1 to 4 carbon atoms, phenoxy, fluoro, chloro, bromo, hydroxy, or the group

wherein each of R_1 and R_2 is, independently hydrogen or lower alkyl, having 1 to 4 carbon atoms,

or a pharmaceutically acceptable acid addition salt thereof.

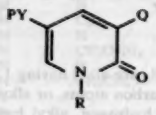
4,004,012

3-CYANO-5-(PYRIDINYL)-2(1H)-PYRIDINONES

George Y. Lesher, East Greenbush, and Chester Joseph Opalka, Schodack, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

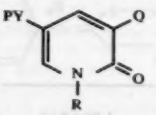
Filed Oct. 14, 1975, Ser. No. 621,763
Int. Cl.² A61K *31/395;* **C07D** *213/57*
U.S. Cl. 424—263 **5 Claims**

1. A 1-R-3-Q-5-PY-2(1H)-pyridinone having the formula



where PY is 4- or 3- or 2-pyridinyl or 4- or 3- or 2-pyridinyl having one or two lower-alkyl substituents, R is hydrogen, lower-alkyl or lower-hydroxyalkyl having from two to six carbon atoms and having its hydroxy group and free valence bond on different carbon atoms an Q is cyano.

5. The method for increasing cardiac contractility in a patient requiring such treatment which comprises administering to such patient an effective amount of a cardiotonic 1-R-3-Q-5-PY-2(1H)-pyridinone having the formula



where PY is 4- or 3- or 2-pyridinyl or 4- or 3- or 2-pyridinyl having one or two lower-alkyl substituents, R is hydrogen, lower-alkyl or lower-hydroxyalkyl having from two to six carbon atoms and having its hydroxy group and free valence bond on different carbon atoms and Q is cyano.

4,004,013

2,4,6,8-TETRA-METHYL-2,4,6,8-TETRAAZABICYCLO-[3.3.0]-OCTANEDI-3,7-ONE IN TREATING PSYCHIC DISORDERS

Sergei Sergeevich Novikov, Kotelnicheskaya naberezhnaya, 1/5, kv. 183; Lenor Ivanovich Khmelnitsky, ul. Miklukho-Maklaya, 57, korpus 1, kv. 139; Oleg Vasilievich Lebedev, ul. Obrucheva, 9, kv. 83; Lia Vladimirovna Epishina, Bolotnikovskaya 40, korpus 1, kv. 16; Ljudmila Ivanovna Suvorova, B. Ostroumovskaya, 15, kv. 24, all of Moscow; Lidia Vasilievna Lapshina, dom otdykha Ostalievo, 17, Moskovskaya oblast Podolsky raion, plo Kyazanovo; Valery Dmitrievich Krylov, ul. Uralskaya, 17, kv. 150, Moscow; Irina Vitalievna Zaikonnikova, Chekhova, 4b, kv. 1, Kazan; Irina Evgenievna Zimakova, ul. Lenina, 2a, kv. 18, Kazan; Vladimir Sergeevich Chudnovsky, ul. Dekabristov, 189, kv. 5, Kazan; Viktor Andreevich Babichev, Komsomolsky prospekt, 38/16, kv. 81, Moscow, and Nina Alexandrovna Avdonina, ul. Gagarina, 14, kv. 3 Kazan, all of U.S.S.R.

Division of Ser. No. 275,823, July 27, 1972, Pat. No. 3,966,742. This application May 30, 1975, Ser. No. 582,425

Int. Cl.[2] A61K *31/46*

U.S. Cl. 424—265 8 Claims

1. A medicinal preparation for the treatment of psychic disorders containing a pharmaceutically acceptable carrier and as active ingredient, 2,4,6,8-tetramethyl-2,4,6,8-tetraazabicyclo-[3.3.0]-octanedi-3,7-one in an effective amount ranging from 0.25 to 1.0 gram when administered orally and in an effective amount ranging from 3 to 10 ml of a 10% solution when administered intramuscularly.

4,004,014

2-AMINO-6-DIALKYLAMINODIHYDROPYRIDINES, THEIR PRODUCTION, PHARMACEUTICAL COMPOSITIONS AND METHODS OF USE THEREOF

Horst Meyer; Friedrich Bossert, both of Wuppertal; Wulf Vater, Opladen, and Kurt Stoepel, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

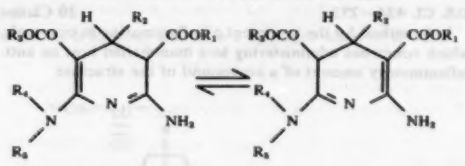
Filed Jan. 29, 1975, Ser. No. 545,202

Claims priority, application Germany, Feb. 9, 1974, 2406198

Int. Cl.[2] A61K *31/455*; C07D *211/00*, *401/00*

U.S. Cl. 424—266 13 Claims

1. A compound of the tautomeric formulas:



wherein each of R_1 and R_3 is alkyl of 1 to 6 carbon atoms;

R_2 is phenyl; phenyl substituted by methyl, methoxy, chloro, bromo, fluoro, nitro, trifluoromethyl, or azido; or pyridyl; and

R_4 and R_5 when taken independently are lower alkyl or when taken together, with the nitrogen to which they are attached, pyrrolidino or piperidino.

8. The method of effecting coronary vessel dilation and reducing blood pressure in humans and other animals which comprises administering thereto an effective amount of a compound according to claim 1.

4,004,015

BICYCLIC DERIVATIVES OF 1,4-DIHYDROPYRIDINE AS ANTIHYPERTENSIVE AGENTS AND CORONARY VESSEL DILATORS

Horst Meyer, Wuppertal; Friedrich Bossert, both of Wuppertal-Elberfeld; Wulf Vater, Opladen, and Kurt Stoepel, Wuppertal-Vohwinkel, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

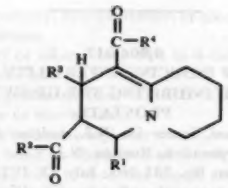
Division of Ser. No. 468,432, May 9, 1974, Pat. No. 3,948,923, which is a division of Ser. No. 336,477, Feb. 28, 1973, Pat. No. 3,856,798. This application Aug. 14, 1975, Ser. No. 604,604

Claims priority, application Germany, Mar. 6, 1972, 2210633

Int. Cl.[2] A61K *31/455*

U.S. Cl. 424—266 15 Claims

1. A pharmaceutical composition comprising a compound of the formula:



wherein

R^1 is hydrogen or lower alkyl;

each of R^2 and R^4, independently of the other, is lower alkoxy or alkynyloxy of 2 to 4 carbon atoms; and

R^3 is lower alkyl; phenyl; phenyl substituted by one to three substituents selected from the group consisting of lower alkyl, trifluoromethyl, cyano, halo, nitro and carbo(lower alkoxy); pyridyl; furyl; thienyl; or naphthyl;

in combination with a nontoxic inert pharmaceutical carrier, said compound being present in said composition in an amount sufficient to produce coronary vessel dilation and an antihypertensive effect in a human.

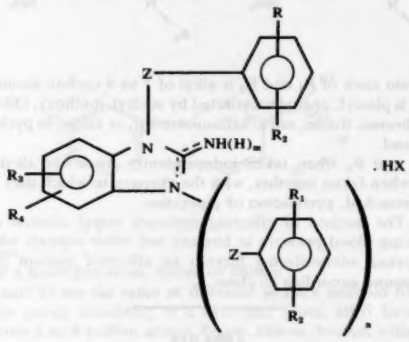
4,004,016

AMINO-BENZIMIDAZOLE DERIVATIVES

Harry L. Yale, New Brunswick, and James A. Bristol, Boonton, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Aug. 11, 1975, Ser. No. 603,484
Int. Cl.² C07D *235/32;* **A61K** *31/415*
U.S. Cl. 424—273 **20 Claims**

1. A method for the treatment of inflammation in mammals, which comprises administering to a mammalian host an anti-inflammatory amount of a compound of the structure



wherein

Z is a straight or branched alkylene group containing 1 to 4 carbons;

R_1 and R_2 are the same or different and are selected from the group consisting of hydrogen, halo, lower alkyl, lower alkoxy, trifluoromethyl or N,N-dimethylsulfonamido;

R_3 and R_4 are the same or different and are selected from the group consisting of hydrogen, lower alkyl, lower alkoxy, phenyl, naphthyl, halo, benzyl, phenethyl, or phenyl or naphthyl including an R_1 or R_2 substituent;

m is 0 or 1 and *n* is 0 or 1, provided that when *m* is 0, *n* is 1 and the ⎓ linking N to the ring C is a double bond while the other ⎓ is a single bond, and when *m* is 1, *n* is 0; the ⎓ linking N to the ring C is a single bond while the other ⎓ is a double bond; and

X is selected from the group consisting of Cl, Br or I.

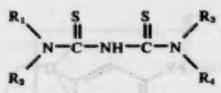
4,004,017

METHOD OF INDUCING INFERTILITY IN MALE ANIMALS AND INHIBITING THE GROWTH OF THE PROSTATE

Joseph A. Settepani, Somerville, N.J., assignor to Ortho Pharmaceutical Corporation, Raritan, N.J.

Division of Ser. No. 381,963, July 23, 1973, Pat. No. 3,932,651, which is a continuation-in-part of Ser. No. 137,426, April 26, 1971, abandoned. This application July 31, 1975, Ser. No. 600,663
Int. Cl.² A61K *31/495, 31/15, 31/40, 31/445*
U.S. Cl. 424—274 **3 Claims**

1. A method of inhibiting fertility in male animals and of reducing the size of the prostate and the seminal vesicle in male animals which comprises orally administering to a male animal an effective non-toxic amount of a compound of the formula:



wherein R_1, R_2, and R_3 are alkyl having 1 to 36 carbon atoms, aryl having 6 to 10 carbon atoms, or alkyl aryl having 7 to 12 carbon atoms, R_4 is hydrogen, alkyl having 1 to 36 carbon atoms, aryl or alkyl aryl; and

and

are each pyrrolidino.

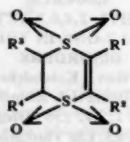
4,004,018

2,3-DIHYDRO-1,4-DITHIIN 1,1,4,4-TETROXIDE ANTIMICROBIALS

Arthur D. Brewer, Puslinch, Canada, and Robert A. Davis, Cheshire, Conn., assignors to Uniroyal Inc., New York, N.Y. and Uniroyal, Ltd., Montreal, Canada

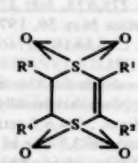
Filed June 20, 1974, Ser. No. 481,010
Int. Cl.² A01N *9/14;* **C07D** *339/08*
U.S. Cl. 424—277 **35 Claims**

1. A method of controlling fungi or bacteria comprising applying to a locus, subject to attack by fungi or bacteria, in bactericidally or fungicidally effective amount, a 2,3-dihydro-1,4-dithiin 1,1,4,4-tetroxide having the following structural formula:



wherein R_1, R_2, R_3, and R_4 are independently hydrogen, alkyl having 1 to 14 carbon atoms, aryl, aryl substituted with one to three substituents selected from the group consisting of lower alkyl, halogen, lower alkoxy, nitro, and aryl, alkoxymethyl wherein the alkyl group contains 1 to 8 carbon atoms, aryloxymethyl, alkylaminomethyl wherein the alkyl group contains 1 to 8 carbon atoms, or adjacent R's may be joined together as a chain of 3 to 4 methylene groups.

26. A 2,3-dihydro-1,4-dithiin 1,1,4,4-tetroxide of the formula:



wherein the R's have sets of values as follows:

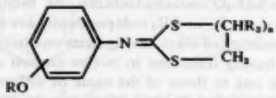
R_1	R_2	R_3	R_4
$pC_3H_4C_6H_4$	H	H	H
CH_3	H	C_6H_5	H
CH_3	H	H	C_6H_5
C_6H_5	H	CH_3OCH_2	H
C_6H_5	H	H	CH_3OCH_2
$pClC_6H_4$	H	CH_2CH_3	H
$pClC_6H_4$	H	H	CH_2CH_3
pFC_6H_4	H	$-(CH_2)_4-$	

4,004,019
INSECT CONTROL COMPOUNDS

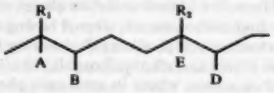
William Wayne Brand, Hopewell, and James Byron Lovell, Pennington, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Sept. 12, 1975, Ser. No. 612,877
Int. Cl.² C07D *339/06*
U.S. Cl. 424—277 24 Claims

1. A compound of the formula:



wherein *n* is 0 or 1; R is a hydrocarbon chain of the following general structure:



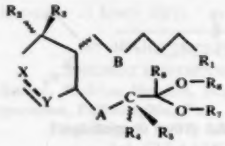
wherein R_1 and R_2 are methyl or ethyl; A is hydrogen, halogen or alkoxy C_1–C_4; B is hydrogen; or A and B together form a carbon-carbon bond, or A and B together represent an "oxido" (—O—) bridge: E and D are hydrogen; or E and D together form a carbon-carbon bond; and R_3 is hydrogen or methyl.

4,004,020
NOVEL PROSTANOIC ACID DERIVATIVES AND PROCESS FOR THE PREPARATION THEREOF

Werner Skuballa; Bernd Raduchel; Helmut Vorbruggen; Walter Elger; Wolfgang Losert, and Olaf Loge, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

Filed Dec. 19, 1974, Ser. No. 534,483
Claims priority, application Germany, Dec. 21, 1973, 2365101
Int. Cl.² A01N *9/28*; A61K *31/335*
U.S. Cl. 424—278 29 Claims

1. A prostaglandin of the formula



wherein R_1 is hydroxymethyl, carboxy, aryloxycarbonyl, alkoxycarbonyl of 1–8 carbon atoms in the alkoxy group, or the group —COO—CH_2—U—V wherein U is a direct C—C bond, carbonyl or carbonyloxy and V is phenyl substituted by phenyl, alkoxy of 1-2 carbon atoms or halogen; R_2 is hydroxy and R_3 is a hydrogen atom or R_2 and R_3 collectively are an oxygen atom; A is trans-CH=CH; B is —CH_2—CH_2 or cis-CH=CH; one of R_4 and R_5 is hydroxy and the other is a hydrogen atom; R_6 and R_7 collectively are alkylene of up to 7 carbon atoms and with 2-3 carbon atoms in the chain, phenylene or naphthylene; R_8 is a hydrogen atom or alkyl of 1–5 carbon atoms,

X—Y is $-CH_2-\underset{\underset{OH}{|}}{CH}-$

when R_2 is hydroxy and R_3 is a hydrogen atom or is

$-CH_2-\underset{\underset{OH}{|}}{CH}-$

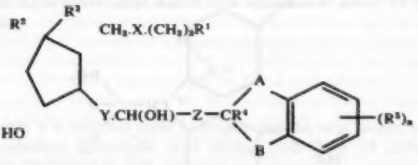
or —CH=CH— when R_2 and R_3 collectively are an oxygen atom; or, when R_1 is carboxy, a physiologically acceptable salt thereof.

4,004,021
CYCLOPENTANE DERIVATIVES

Jean Bowler; Edward Douglas Brown; Peter Robert Marsham, and Edward Raymond Halstead Walker, all of Macclesfield, England, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 434,303, Jan. 17, 1974. This application Dec. 18, 1975, Ser. No. 641,871
Claims priority, application United Kingdom, Jan. 31, 1973, 4769/73
Int. Cl.² C07D *307/78*
U.S. Cl. 424—278 7 Claims

1. A cyclopentane derivative of the formula:



wherein R^1 is carboxy, hydroxymethyl or alkoxycarbonyl of up to 11 carbon atoms,
R^2 is hydroxy or alkanoyloxy of 1 to 4 carbon atoms, and
R^3 is hydrogen, or
R^2 and R^3 together are oxo,
X is ethylene or cis-vinylene,
Y is ethylene or trans-vinylene,
Z is a direct bond or alkylidene of 1 to 5 carbon atoms,
A is alkylidene of 1 to 5 carbon atoms and
B is oxygen,
R^4 is hydrogen or alkyl of 1 to 4 carbon atoms, or
CR^4 together with an adjacent carbon of A or B forms a double bond,
R^5 is halogen or alkyl, alkoxy or halogenoalkyl each of 1 to 5 carbon atoms,
which compound bears 0 or 1 alkyl substituent of 1 to 4 carbon atoms on the trimethylene group, and for those compounds wherein R^1 is carboxy, the pharmaceutically or veterinarily acceptable base addition salts thereof.

4,004,022

SPIROLACTONE DERIVATIVES

Izumi Kumita, Oiso; Akiyoshi Ueda, Hiratsuka; Kazuhiko Ohkuma, Ninomiya; Sho Hashimoto, Odawara; Akira Nakada, Hiratsuka, and Masami Mizuno, Oiso, all of Japan, assignors to Nippon Soda Company Limited, Tokyo, Japan

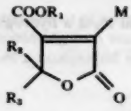
Filed July 28, 1975, Ser. No. 599,428

Claims priority, application Japan, Aug. 9, 1974, 49-90774

Int. Cl.² C07D *307/58*

U.S. Cl. 424—279 **13 Claims**

2. A fungicidal composition comprising an inert carrier and a fungicidally effective amount of a compound of the formula



wherein

R_1 is lower alkyl;

R_2 and R_3 are methyl, or R_2 forms cyclo-alkylene of 4 to 5 carbon atoms by combining with R_3;

M is a substituent selected from the group consisting of $-CH_2X$ and $-CHX_2$ in which X is halogen.

4,004,023

1-(4-BUTYLPHENYL)-1-(3,4-METHYLENEDIOXYPHENYL)-2-NITROALKANES AND SYNERGISTIC INSECTICIDAL MIXTURES THEREWITH

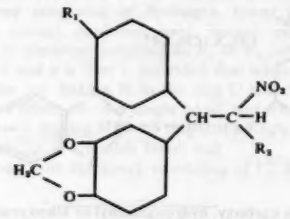
Jerry Glenn Strong, Warren, and Harold Alexander Kaufman, Piscataway, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Oct. 1, 1975, Ser. No. 618,660

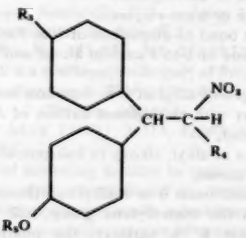
Int. Cl.² C07D *317/44*

U.S. Cl. 424—282 **9 Claims**

1. An insecticidally effective composition comprising about 0.001–0.005 weight percent, based on the total weight of the composition, of a synergistic combination of a compound having the structure:



wherein R_1 is C_4 alkyl branched or unbranched and R_2 is methyl or ethyl and a compound having the structure:



wherein R_3 is C_4 alkyl branched or unbranched, R_4 is methyl or ethyl and R_5 is ethyl, said synergistic combination containing 10–90 to 90–10 weight percent of each compound; and an inert solid or liquid carrier.

6. A method of insect-control comprising applying to an insect or its environment an insecticidally effective amount of a composition as described in claim 1.

4,004,024

DISINFECTANT FURANS

Heinz Eggensperger; Wolfgang Beilfuss, and Helmut Hermann Ehlers, all of Hamburg, Germany, assignors to Sterling Drug Inc., New York, N.Y.

Filed July 7, 1975, Ser. No. 593,558

Claims priority, application Germany, July 15, 1974, 2433836

Int. Cl.² A61K *31/34*

U.S. Cl. 424—285 **10 Claims**

1. A method for controlling bacteria, fungi and spores which comprises applying thereto a bactericidally, fungicidally and sporicidally effective amount of a furan selected from the group consisting of 2-(R_1O)-5-(R_2O)-2,5-dihydrofuran and 2-(R_1O)-5-(R_2O)-tetrahydrofuran, or mixtures of said compounds, where R_1 and R_2 independently are selected from the group consisting of alkyl having from one to twelve carbon atoms, alkyl having from one to twelve carbon atoms substituted by from one to three of the same or different halo substituents, hydroxyalkyl having from two to twelve carbon atoms, nitroalkyl having from two to twelve carbon atoms, phenylalkyl wherein alkyl has from one to two carbon atoms, phenoxyalkyl wherein alkyl has from one to two carbon atoms, cycloalkyl having from five to six ring carbon atoms and a total of from five to twelve carbon atoms, alkenyl having from three to four carbon atoms, alkynyl having from three to four carbon atoms, glycidyl, alkoxyalkyl having from three to twelve carbon atoms and alkoxyalkoxyalkyl having from four to twelve carbon atoms; where in each case phenyl and phenoxy are unsubstituted or substituted by one or two of the same or different substituents selected from the group consisting of halo, hydroxy and nitro.

4,004,025

LONG-ACTING LOCAL SUBCUTANEOUSLY-APPLIED ANESTHETICS AND COMPOSITIONS CONTAINING THE SAME

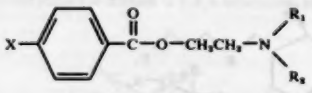
Jack Fishman, New York, N.Y., assignor to Evalina Lewenstein and Henry Hirsch and Stanley Rothschild, trustees, all of New York, N.Y.

Continuation-in-part of Ser. No. 501,131, Aug. 28, 1974, abandoned, which is a division of Ser. No. 324,823, Jan. 18, 1973, abandoned. This application Feb. 4, 1976, Ser. No. 655,458

Int. Cl.² A61K *31/235*

U.S. Cl. 424—308 **15 Claims**

1. A composition for subcutaneous administration to induce local anesthesia, said composition being in the form of an injectable solution, said composition comprising an anesthetically effective amount of a compound having the formula



where X is selected from the group consisting of

or HC C and where each of R_1 and R_2 is selected from the

group consisting of H, lower alkyls containing up to 6 carbon atoms, cyclopropyl, cyclobutyl and cyclohexyl, or pharmaceutically acceptable salts thereof, and a sterile water carrier for said compound.

4,004,026

DICARBOXYLIC ACIDS AND DERIVATIVES IN THE TREATMENT OF PAIN AND INFLAMMATION

Georges Haas, Oberwil; Erwin F. Jenny, Basel, and Alberto Rossi, Oberwil, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 389,105, Aug. 16, 1973, Pat. No. 3,940,434. This application Nov. 18, 1975, Ser. No. 632,926 Claims priority, application Switzerland, Aug. 24, 1972, 12538/72

Int. Cl.² A61K *31/19, 31/22*

U.S. Cl. 424—311 **8 Claims**

1. An analgesic or antiinflammatory pharmaceutical composition comprising an analgesically or antiinflammatory effective amount of a compound corresponding to the formula

wherein A denotes the direct bond or a methylene group, one of the groups R_1 and R_2 denotes hydrogen, halogen, alkyl with 1 to 4 carbon atoms, or trifluoromethyl and the other denotes cycloalkyl with 4 to 8 carbon atoms, X_1 and X_2 independently of one another denote a carboxyl group or an alkoxycarbonyl group with 2 to 5 carbon atoms, and n denotes an integer from 1 to 3, or a pharmaceutically acceptable salt thereof, together with a pharmaceutical carrier.

8. The method for treating inflammatory conditions in a mammal suffering therefrom, which comprises administering to said mammal an antiinflammatory effective dose of a composition according to claim 1.

4,004,027

PROSTAGLANDIN ANTAGONISTS

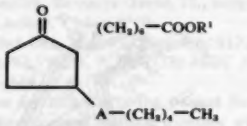
Wilbur Lippmann, Montreal, and Jehan F. Bagli, Kirkland, both of Canada, assignors to Ayerst McKenna and Harrison Ltd., Montreal, Canada

Filed Jan. 28, 1975, Ser. No. 545,664

Int. Cl.² A61K *31/215, 31/19*

U.S. Cl. 424—317 **4 Claims**

1. A method for relieving a complication arising from abnormally increased physiological availability of prostaglandins in a host, comprising: administering to said host a complication alleviating dose of a compound of formula I



I

in which A is —CHOH—C C— or —C C—CHOH— and R^1 is hydrogen or lower alkyl.

4,004,028

PHENOXYPROPANOLAMINES

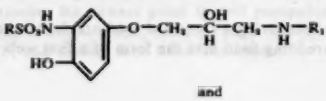
Carl Kaiser, Haddon Heights, N.J., assignor to SmithKline Corporation, Philadelphia, Pa.

Filed Aug. 6, 1975, Ser. No. 602,158

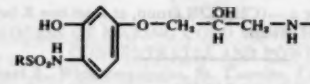
Int. Cl.² A61K *31/18*

U.S. Cl. 424—321 **6 Claims**

1. A chemical compound of the formulas:



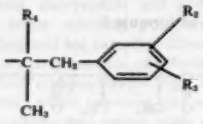
and



or a pharmaceutically acceptable acid addition salt of said compound, wherein:

R is a straight or branched chain lower alkyl of from 1 to 5 carbon atoms;

R_1 is branched chain lower alkyl of from 3 to 5 carbon atoms, cycloalkyl or cycloalkylmethyl, the cycloalkyl moiety having from 3 to 6 carbon atoms or



R_2 and R_3 are hydrogen, hydroxy, methoxy and R_4 is hydrogen or methyl.

4,004,029

COMPOSITIONS AND METHOD FOR TREATING EPILEPSY AND CONVULSIONS

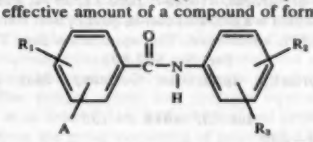
Robert James Collins, and Charles E. Coverdale, both of Portage, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 469,485, May 13, 1974, abandoned, which is a continuation of Ser. No. 347,794, April 4, 1973, abandoned. This application Sept. 8, 1975, Ser. No. 610,939

Int. Cl.² A61K *31/13*

U.S. Cl. 424—325 **19 Claims**

1. A method of controlling convulsions and seizures in mammals in need of such therapy which comprises administering an effective amount of a compound of formula:



wherein R_1 and R_2 are each selected from hydrogen and lower alkyl; R_3 is lower alkyl and A is a monovalent group of formula:

wherein Y is selected from hydrogen and the acyl radical of a hydrocarbon carboxylic acid having from 2 to 18 carbon atoms, inclusive; to said mammals.

4,004,030

MICROBIOCIDALLY EFFECTIVE AMINES OR AMINE MIXTURES

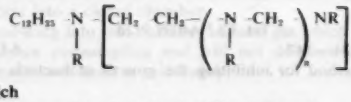
Günter Schwarzmann, Essen-Uberruhr, and Ulrich Holtschmidt, Essen, both of Germany, assignors to Th. Goldschmidt AG, Germany

Continuation-in-part of Ser. No. 376,962, July 6, 1973, abandoned. This application Dec. 23, 1974, Ser. No. 535,552 Claims priority, application Germany, July 11, 1972, 2234017; Sept. 13, 1972, 2244814

Int. Cl.² A01N *9/20, 9/24*

U.S. Cl. 424—325 **14 Claims**

1. A process for killing microbes which comprises contacting said microbes with a microbiocidally effective amount of a compound having the formula



in which

n and *m* are 0 or 1, and *n* is 0 if *m* is 0, and

R is hydrogen or a $-(CH_2)_2OH$ group, at least one R being a $-(CH_2)_2OH$ group.

4,004,031

BIS-(O-1-ALKYLTHIO-ETHYLIMINO)-N-METHYL-CARBAMIC ACID)-N,N'-SULPHIDE INSECTICIDES

Jozef Drabek, Allschwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

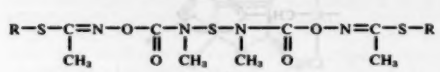
Filed July 9, 1975, Ser. No. 594,381

Claims priority, application Switzerland, July 11, 1974, 9608/74; May 27, 1975, 6749/75

Int. Cl.² A01N 9/20

U.S. Cl. 424—327 **13 Claims**

1. A compound of formula I



(I)

wherein R represents a C_1-C_5-alkyl radical.

9. A method for combatting insects which comprises applying to the locus of said insects an insecticidally effective amount of a compound according to claim 1.

4,004,032

PHARMACEUTICAL COMPOSITIONS CONTAINING A 1-(3-TRIFLUOROMETHYL-4'-CHLORO-PHENYL)-2-(CARBOXYLIC ACYLAKYL-AMINO) PROPANE AND METHOD OF USE

Kurt Schromm; Ernst-Otto Renth; Anton Mentrup, and Richard Reichl, all of Ingelheim am Rhein, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

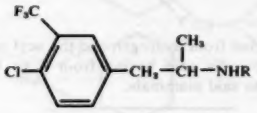
Division of Ser. No. 478,264, June 11, 1974, Pat. No. 3,950,335, which is a continuation-in-part of Ser. No. 138,002, April 27, 1971, abandoned. This application Jan. 27, 1976, Ser. No. 652,801

Claims priority, application Germany, May 2, 1970, 2021620

Int. Cl.² A61K 31/135

U.S. Cl. 424—330 **8 Claims**

1. An anorectic pharmaceutical oral dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective anorectic amount of a racemic or optically active compound of the formula



wherein

R is $-(CH_2)_n-CO-C_6H_5$ or $-(CH_2)_n-CO-CH_3$,

n is 1 or 2, or a non-toxic, pharmacologically acceptable acid addition salt thereof.

4,004,033

CERTAIN ALKYLPHENOLS USED TO CONTROL BACTERIA

Max Schellenbaum, Muttenz, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

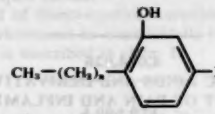
Continuation-in-part of Ser. No. 496,799, Aug. 12, 1974, abandoned. This application Mar. 24, 1975, Ser. No. 561,521

Claims priority, application Switzerland, Aug. 16, 1973, 11806/73

Int. Cl.² A01N 9/26

U.S. Cl. 424—347 **4 Claims**

1. A method for inhibiting the growth of bacteria which comprises applying thereto a growth-inhibiting amount of a compound of the formula



wherein

X represents chlorine or bromine and

n denotes an integer from 1 to 6.

4,004,034

PROCESS FOR THE MANUFACTURE OF WORTS

Alain Delhaye, Marquette Lez Lille; Manfred M. Moll, Champigneulles, both of France, and James R. Pollock, Reading, England, assignors to Grandes Malteries Modernes, Marquette Lez Lille; Groupement D'Interet Economique Tepral, Champigneulles, both of France and Pollock International Limited, Hamilton, Bermuda

Continuation of Ser. No. 273,962, July 21, 1972, abandoned. This application Oct. 29, 1974, Ser. No. 519,010

Claims priority, application France, July 26, 1971, 71.27330

Int. Cl.² C12C 7/00

U.S. Cl. 426—29 **9 Claims**

1. A process for the manufacture of a wort which comprises subjecting barley to at least one treatment cycle comprising a steeping in water followed by exposure to air, the conditions of temperature and the duration of the stages of this cycle being chosen to cause chitting of the barley to form chit malt and to promote the development of a maximum enzymatic potential, rolling the chit malt, drying the rolled chit malt to stop the development of the biological processes occuring in it while retaining its enzymatic potential, grinding the dried and rolled chit malt and extracting it with a mixture of hot water and malt, the quantity of malt being 10 to 40% by weight on a solids basis of the dry weight of the mixture of ground chit and malt, and separating the wort so produced.

4,004,035

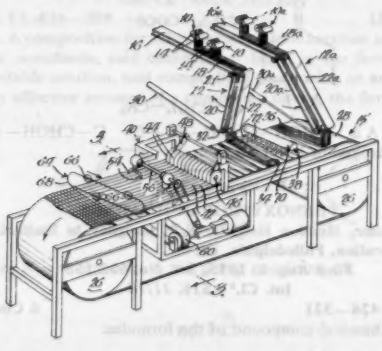
METHOD AND APPARATUS FOR PRODUCING LAPPED SHREDDED FOOD ARTICLES

Rudolph W. Hirzel, Climax; Albert W. Olmstead, Pennfield, and Winship C. Howard, Battle Creek, all of Mich., assignors to Kellogg Company, Battle Creek, Mich.

Filed July 28, 1975, Ser. No. 599,669

Int. Cl.² A21D 6/00

U.S. Cl. 426—275 **9 Claims**



1. Method of preparing a shredded food article comprising the steps of shredding food into the form of a first web com-

prised of parallel strands of shredded food, lapping the first web back and forth transversely across a moving support bed to produce a second web composed of layers of shredded food strands, lying in an overlapping zigzag configuration on said bed, said second web having a width and thickness greater than that of the first web, and then dividing said second web into a plurality of separate articles.

4,004,036

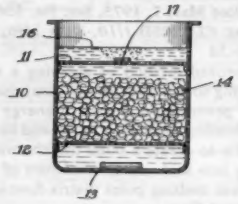
EFFERVESCENT MOLDED TRITURATE TABLETS

William H. Schmitt, Elmhurst, Ill., assignor to Alberto Culver Company, Melrose Park, Ill.

Continuation of Ser. No. 553,989, May 31, 1966, abandoned. This application Mar. 20, 1970, Ser. No. 21,512

Int. Cl.² A23L *1/22, 1/236, 2/40*

U.S. Cl. 426—285 **8 Claims**



1. A method of preparing effervescent molded triturate tablets which are rapidly disintegratable and soluble or dispersible in hot or cold aqueous media, which comprises providing a mixture of pulverulent materials containing two separate ingredients capable of reacting in the presence of water to produce a gas, triturating said mixture, in the presence of a limited amount of water, to form a moldable mass with a volatile organic solvent ingredient in which at least one of said pulverulent materials is at least partially soluble, said limited amount of water not exceeding 10% by weight of said volatile organic solvent, molding said mass into tablet form, said separate gas-forming ingredients interacting to a substantially limited extent to form a small amount of gas in each tablet, and then removing said organic solvent from said tablets, said gas serving to form a substantial number of voids in the bodies of said tablets.

4,004,037

PEANUT BUTTER MANUFACTURE

Francis G. Connick, Downers Grove, Ill., assignor to Swift and Company Limited, Chicago, Ill.

Filed Oct. 25, 1974, Ser. No. 517,924

Int. Cl.² A23L *1/36, 1/38;* **B02C** *19/00*

U.S. Cl. 426—324 **14 Claims**

1. A process for manufacturing peanut butter comprising steps of: grinding roasted peanuts together with solid carbon dioxide to form a pumpable peanut butter grind, to an extent such that the grind contains only trace amounts of free oxygen and some included carbon dioxide gas and the grind is simultaneously cooled by said solid carbon dioxide to thereby minimize oxidation and heat damage during said grinding, the grinding being accomplished in an open, atmospheric environment and under atmospheric pressure, said solid carbon dioxide being in an amount such that said simultaneous cooling maintaining a grinding temperature within the approximate range of about 40° to about 120° F.; filling the pumpable peanut butter grind into container, said filling step including maintaining the peanut grind in said pumpable condition by keeping it within a temperature range of about 80° to about 100° F; and sealing such filled containers.

4,004,038

PROCESS OF MAKING COLD WATER SOLUBLE TEA CONCENTRATES AND POWDERS

Robert L. Wickremasinghe, St. Coombs, Ceylon, assignor to Tea Research Institute of Ceylon, Ceylon

Filed Oct. 11, 1974, Ser. No. 514,329

Claims priority, application Ceylon, Oct. 12, 1973, 7118

Int. Cl.² A23F *3/00;* **B01D** *13/00, 15/08, 31/00*

U.S. Cl. 426—422 **12 Claims**

1. A process for manufacturing cold water soluble tea concentrate and powder which comprises preparing a tea extract by extracting tea leaves with hot water, selectively removing nonphenolic compounds of high molecular weight comprising chlorophyll, protein, polypeptide and polysaccharide from said tea extract while retaining polyphenolic compounds therein by subjecting said tea extract to filtration through a gel or solid material which is capable of effecting the separation of said nonphenolic compounds of high molecular weight from said tea extract which contains said polyphenolic compounds and also caffeine and amino acids and then concentrating the resultant filtered tea extract to obtain a cold water soluble tea concentrate or powder.

4,004,039

SWEETENING COMPOSITION AND PROCESS THEREFOR

Myron D. Shoaf, and LaMonte D. Pischke, both of Danbury, Conn., assignors to General Foods Corporation, White Plains, N.Y.

Continuation of Ser. No. 421,295, Dec. 3, 1973, Pat. No. 3,928,633. This application Dec. 8, 1975, Ser. No. 638,577

The portion of the term of this patent subsequent to Dec. 23, 1992, has been disclaimed.

Int. Cl.² A23L *1/236*

U.S. Cl. 426—548 **7 Claims**

1. Process for stabilizing L-aspartyl-L-phenylalanine methyl ester crystals into a particulate form adapted to be intermixed with other powderous materials and be free-flowing therewith which comprises admixing said ester crystals and a fusing and matrix-forming material selected from the group consisting of dried coffee extract, whey, low dextrose equivalent starch polymers in an intermixture with a polyol and protein extracts selected from the group consisting of gelatin and keratin, said matrix-forming material having a moisture content less than 10%, said material being molten at a temperature at or below 370° F, solidifying into a solid mass when cooled to below its melting point and retaining a thermosetting solid condition at ambient temperatures; heating the admixture of said ester crystals and said fusing and matrix-forming material to a temperature sufficient to convert said fusing and matrix-forming material into a continuous molten condition but below the melting point of the ester crystals wherein the ester crystals are discretely distributed; cooling the molten mass to fuse the same and permanently fix the ester crystals in a dispersed phase; and sub-dividing the cooled mass to a particular size thereby producing particles which encapsulate the crystals distributed therein.

4,004,040

WHIPPED HONEY SPREAD

Ruben W. Puta, Box 46, St. Nazianz, Wis. 54232

Continuation of Ser. No. 522,481, Nov. 11, 1974, abandoned. This application Apr. 8, 1976, Ser. No. 674,978

Int. Cl.² A23L *1/08*

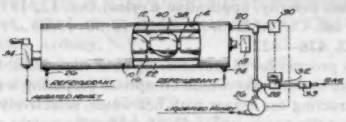
U.S. Cl. 426—564 **12 Claims**

1. A process for making a whipped honey spread consisting essentially of the steps of

introducing a feed consisting essentially of unpasteurized natural honey in liquefied and substantially ungranulated form into a closed chamber,

introducing into said chamber an inert gas which is safe for human consumption and will not deleteriously affect yeasts contained in said honey,

shearing and agitating said honey inside said chamber in the presence of said gas and under superatmospheric pressure, while maintaining said honey at a temperature from about 50° to 60° F, to incorporate and uniformly distribute minute bubbles of said gas throughout said honey,



withdrawing a resulting whipped product from said chamber, and

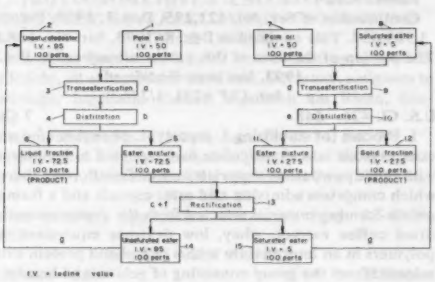
curing said product to a butter-like consistency.

4,004,041

PRODUCTION OF LIQUID EDIBLE OIL FROM PALM OIL OR SIMILAR OILS

Ladislav Koslowsky, Ramat-Gan, Israel, assignor to H.L.S. Ltd., Industrial Engineering Company, Petah-Tikva, Israel

Filed Sept. 12, 1975, Ser. No. 612,982
Claims priority, application Israel, Nov. 22, 1974, 46106
Int. Cl.² A23D *5/00*
U.S. Cl. 426—601 **14 Claims**



1. A process of producing an improved edible liquid oil from an oil selected from amongst natural and semiprocessed vegetable and animal oils and fats and mixtures thereof, and comprising saturated and unsaturated fatty acids moieties in a relative molar ratio of about 1:1 where at least 90% of the saturated fatty acid moieties contain not more than 16 carbon atom molecules, which process comprises the steps of:

a. reacting a portion of said oil with at least one unsaturated fatty acid ester of a (C_1–C_3)-alkanol provided that where a mixture of two or more such esters are used, they are all derived from the same alkanol, in the presence of a transesterification catalyst, to form a first product mixture;

b. subjecting said first product mixture to distillation under reduced pressure not exceeding 40 Torr, thereby to obtain a first distillate being a mixture of alkanol esters of saturated and unsaturated fatty acids, and a first distillation residue being an edible liquid oil having a higher iodine value than said oil used as starting material;

c. subjecting said first distillate to fractional distillation under reduced pressure not exceeding 40 Torr, to separate it into a lower boiling saturated fatty acid ester fraction and a higher boiling unsaturated fatty acid ester fraction;

d. reacting the saturated fatty acid ester fraction obtained in step (c) with another portion of said oil in the presence of a transesterification catalyst to form a second product mixture;

e. subjecting said second product mixture to distillation under reduced pressure not exceeding 40 Torr, thereby to obtain a second distillate being a mixture of alkanol esters of saturated and unsaturated fatty acids, and a second distillation residue being an oil having a lower iodine value than said oil used as starting material;

f. subjecting said second distillate to fractional distillation under reduced pressure not exceeding 40 Torr, to separate it into a lower boiling saturated fatty acid ester fraction and a higher boiling unsaturated fatty acid ester fraction; and

g. recycling said unsaturated fatty acid ester fractions obtained in steps (c) and (f) to the first transesterification step (a) and recycling the saturated fatty acid ester fraction obtained in step (f) to the second transesterification step (d).

4,004,042

METHOD FOR APPLYING A WEAR AND IMPACT RESISTANT COATING

Thomas E. Fairbairn, Westland, Mich., assignor to Sirius Corporation, Toledo, Ohio

Filed Mar. 7, 1975, Ser. No. 556,247
Int. Cl.² B05D *1/10, 3/00, 1/36, 7/14*
U.S. Cl. 427—34 **11 Claims**

1. The improved method of applying a wear and impact resistant coating to a base material comprising the steps of:

electrically generating a stream of energy having the capability of heating the base material and the coating mixture sufficiently to create a bond therebetween;

introducing into said stream a mixture of tungsten carbide and a lower melting point matrix-forming material, both in powdered form;

applying said mixture containing stream to the base material to create a coating thereon;

applying by means of said stream, immediately after application of said mixture and without withdrawal of said stream, an additional oxidation-preventing coating prior to fusing; and

thereafter fusing said coatings to the base material at an elevated temperature.

4,004,043

NITRATED POLYMERS AS POSITIVE RESISTS

Hiroyuki Hiraoka, Los Gatos, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 26, 1975, Ser. No. 616,980
Int. Cl.² B05D *3/06*
U.S. Cl. 427—43 **8 Claims**

1. A process for forming an image with a positive resist, said process comprising the steps of:

1. forming on a substrate a film comprising a polymer or copolymer of methacrylic acid, methacrylic anhydride, methyl methacrylate, methacrylimide, and N-alkylmethacrylimides, said polymer or copolymer having been nitrated in up to about 10% of the monomer units on the methyl group branching off the polymer chain,

2. exposing said film in a predetermined pattern to radiation, and

3. removing the radiation exposed portion of said film with a solvent.

4,004,044

METHOD FOR FORMING PATTERNED FILMS UTILIZING A TRANSPARENT LIFT-OFF MASK

Jack R. Franco, Poughkeepsie; Janos Havas, Hopewell Junction, and Lewis J. Rompala, Wappingers Falls, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 9, 1975, Ser. No. 576,054
Int. Cl.² B05D *5/12, 1/32*
U.S. Cl. 427—43 **7 Claims**

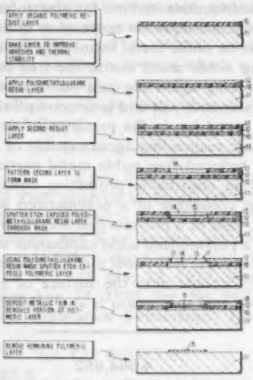
1. A lift-off method for forming a patterned film on a substrate comprising:

forming on said substrate a first masking layer of organic polymeric material,

forming on said first layer a transparent layer of polydimethylsiloxane resin material having a preponderance of Si-O bonds relative to the number of $Si-CH_3$ bonds,

forming on said layer of resin material a second masking layer having openings in a desired pattern,

forming by reactive sputter etching in a fist gas ambient including a fluorine-containing gas openings through said layer of resin material aligned with said openings in said second masking layer,



forming by reactive sputter etching in a second gas ambient including oxygen openings through said first masking layer aligned with said openings in said layer of resin material, the last named reactive sputter etching being continued until the edges in said openings through said resin material overhang the edges in said openings through said first masking layer,

depositing said film onto said substrate through said openings in said layer of resin material and said first masking layer, and

removing said layers.

4,004,045

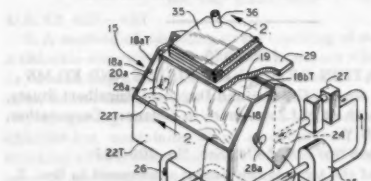
METHOD FOR FLUID FILM APPLICATION

Manfred K. Stelter, 1450 Sunnyside, Highland Park, Ill. 60035

Filed Aug. 9, 1974, Ser. No. 496,070

Int. Cl.² B05D *3/06, 3/10*

U.S. Cl. 427—55 **8 Claims**



1. A method for applying a uniform micro-thin coating of fluid onto the surface of a panel comprising the steps of mounting said panel onto an incline guide means which aligns said panel in an inverted position for preventing the contamination of said panel surface by falling dust particles or the like, and moving said inverted panel in said incline guide means through a position contiguous with the path of a laminar flowing curtain of coating fluid which is moving in a substantially opposite direction to said moving surface across the horizontal top edge of a wall defining a weir, said coating fluid contacting said panel surface and a micro-thin layer of said fluid is transferred to said surface by means of surface tension.

4,004,046

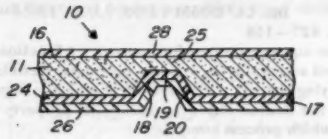
METHOD OF FABRICATING THIN MONOCRYSTALLINE SEMICONDUCTIVE LAYER ON AN INSULATING SUBSTRATE

James B. Price, Phoenix, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Continuation of Ser. No. 239,607, March 30, 1972, abandoned. This application Feb. 27, 1975, Ser. No. 553,769

Int. Cl.² B44D *1/18;* **H01L** *7/50*

U.S. Cl. 427—85 **7 Claims**



1. A method of forming a semiconductor substrate located over a dielectric layer for receiving semiconductor devices comprising the steps of:

a. selecting a body of semiconductor material with substantially planar upper and under surfaces and having a predetermined thickness;

b. removing selectively semiconductor material from the under surface of said body towards its upper surface a predetermined depth for forming a channel, said channel having a channel bottom surface portion substantially parallel to and a predetermined distance from said upper surface, the distance between said upper surface and said channel bottom surface portion defining the upper and lower semiconductor surfaces of the semiconductor substrate;

c. depositing a dielectric material in said channel for selectively forming a dielectric layer for minimizing capacitance between said semiconductor material and said dielectric layer;

d. depositing a layer of material over said dielectric layer for forming a base supporting member for said substrate; and

e. forming directly into the upper surface above said channel of the semiconductor substrate at least one semiconductor junction device.

4,004,047

DIFFUSION COATING METHOD

John J. Grisik, Middletown, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Division of Ser. No. 447,318, March 1, 1974. This application Sept. 2, 1975, Ser. No. 609,829

Int. Cl.² B23P *7/04*

U.S. Cl. 427—142 **9 Claims**

1. In a diffusion coating method in which a coating metal is transferred and diffused from a coating metal source alloy into an article surface at a coating temperature in the range of 1700°–2100° F, the improvement which comprises:

providing a mixture comprising a coating powder and a binder of a type which will decompose substantially without residue upon heating below the coating temperature, the coating powder including the coating metal source alloy which consists essentially of, by weight, about 51 – 61% Al, with the balance Fe, the alloy being predominantly in the form of a two-phase structure of Fe_2Al_5 and $FeAl_2$ which melts above the coating temperature;

disposing the mixture in a layer of substantially uniform thickness to provide a substantially flexible film;

placing the film in contact with the article surface; and then

applying heat in the range of about 1700 – 2100° F to transfer and diffuse the coating metal from the film into the surface.

4,004,048

RAPID FIXATION OF AGENTS ON FLEXIBLE SUBSTRATES

Harold L. Jackson, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 486,115, July 5, 1974, Pat. No. 3,958,934, which is a continuation-in-part of Ser. No. 367,333, June 5, 1973, abandoned. This application May 28, 1975, Ser. No. 581,571

The portion of the term of this patent subsequent to May 25, 1993, has been disclaimed.

Int. Cl.² D06M *13/08, 13/36, 13/18*

U.S. Cl. 427—158 19 Claims

1. Non-aqueous process for improving a functional property of natural and synthetic, organic, polymeric flexible substrates by applying thereto a non-dye agent which is capable of imparting the desired improved functional property to the substrate, which process comprises:

a. applying said agent to the substrate from a liquid medium;

b. optionally, drying the substrate to remove the liquid while substantially retaining the agent on the substrate; and

c. contacting the agent-treated substrate with a fluorocarbon fluid at a temperature and for a time sufficient to effect fixation of the agent on the substrate, said fluorocarbon having an atmospheric pressure boiling point of at least 25° C., a fluorine to carbon atom ratio of at least 1.5 and a solubility parameter of not greater than 7.0 and being selected from the group consisting of saturated fluorocarbons and perfluorotrialkyl and perfluorotetraalkyl ethylenes.

4,004,049

SPRAYABLE LATEX ADHESIVE SYSTEMS PROVIDING RAISED SPACED DEPOSITS OF ADHESIVE AND LAMINATES PREPARED THEREFROM

David W. Horwat, Morristown, and Albert T. Goldberg, Summit, both of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Dec. 8, 1975, Ser. No. 638,317

Int. Cl.² B05D *1/02, 5/10;* B32B *3/10, 7/14*

U.S. Cl. 427—207 C 7 Claims

1. A method for applying an aqueous adhesive polymer latex to a substrate as raised, spaced deposits which comprises spraying an aqueous pressure sensitive adhesive polymer latex having glass transition temperature of −10° to −80° C., a surface tension of at least 42 dynes/cm², a viscosity of 25 to 2,000 cps, a Hamilton Beach grit value of 0.03 to 3.0 and an average particles size of less than 0.5 microns, said spraying occurring in an atmosphere essentially free of volatile basic compounds at a pressure sufficient to atomize and destabilize the latex.

4,004,050

TWO-PART PRIMER SYSTEM FOR FRP BONDING

Thomas G. Rabito; Alvin J. Kieft, and Richard L. Cline, all of Ashland, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Aug. 26, 1974, Ser. No. 500,220

Int. Cl.² B32B *27/40;* C09J *5/02*

U.S. Cl. 427—302 4 Claims

1. A method for improving the adhesion between an adhesive of the isocyanate class and a polyester composition comprising treating the surface of the polyester composition with a first and second treating agent without regard to sequence and then applying an adhesive of the isocyanate class and curing said adhesive, said first treating agent being an organic polyisocyanate and the second treating agent being a tertiary amine.

4,004,051

AQUEOUS NOBLE METAL SUSPENSIONS FOR ONE STAGE ACTIVATION OF NONCONDUCTORS FOR ELECTROLESS PLATING

Leon A. Kadison, and Eileen Maguire, both of Pasadena, Calif., assignors to Crown City Plating Company, El Monte, Calif.

Continuation-in-part of Ser. No. 443,082, Feb. 15, 1974, abandoned. This application Feb. 10, 1975, Ser. No. 548,539

Int. Cl.² C23C *3/02*

U.S. Cl. 427—304 52 Claims

1. An activator suspension for the one stage surface activation of a nonconductive surface for electroless plating which comprises an acidic aqueous suspension of absorbable particles of at least on noble metal formed by the reduction of the corresponding noble metal ion to the free metal state by at least one reducing agent for said noble metal ion which is other than a stannous salt and is noncomplexing with respect to the noble metal ion in the presence of at least one water soluble, organic suspending agent capable of preventing condensation of reduced free noble metal particles without the formation of an absorbable protective colloid and selected from a group consisting of a polymerized alkyl napthalene sulfonic acid, salts of a polymerized alkyl napthalene sulfonic acid, salts of a polymerized alkyl napthalene sulfonic acid and mixtures thereof, the free noble metal particles in said suspension being absorbable onto the surface of a nonconductive substrate when said suspension is at a pH below about 3.5.

4,004,052

PROCESS FOR PRODUCING NON-POROUS COATING FOR CORUNDUM SUBSTRATES

Vera Ivanovna Bystrova, ulitsa Sojuza Svyazi, 8, kv. 28; Galina Konstantinovna Kirillova, Baskov pereulok, 19, kv. 18, and Galina Atkhipovna Mikhailova, Liteiny prospekt 46, kv. 13, all of Leningrad, U.S.S.R.

Continuation of Ser. No. 449,509, March 8, 1974, abandoned, which is a continuation of Ser. No. 300,235, Oct. 24, 1972, abandoned. This application Dec. 1, 1975, Ser. No. 636,446

Int. Cl.² B05D *3/02;* B32B *9/04, 13/04*

U.S. Cl. 427—374 F 1 Claim

1. A process for producing a non-porous coating for corundum substrates having a corundum content of 90 to 100%, comprising applying a barium, calcium or strontium alumosilicate glaze layer onto said corundum substrate and heat treating the same at a temperature within the range of from 1,350° to 1,650° C at a heating rate of from 100° to 500° C per hour, and thereafter cooling at a rate of about 150° C per hour, whereby corundum from the surface layer of said substrate reacts with said glaze thus forming a barium, calcium or strontium feldspar glass-ceramic coating on the substrate.

4,004,053

STABILIZATION OF ACRYLIC FIBERS AND FILMS

Klaus Hannes Gump, Gillette, and Dagobert Engelbert Stuetz, Westfield, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Nov. 18, 1971, Ser. No. 200,183

The portion of the term of this patent subsequent to Dec. 2, 1992, has been disclaimed.

Int. Cl.² B05D *3/02*

U.S. Cl. 427—379 28 Claims

1. An improved process for the stabilization of an acrylic fibrous material or film selected from the group consisting of an acrylonitrile homopolymer and acrylonitrile copolymers containing at least about 85 mol percent of acrylonitrile units and up to about 15 mol percent of one or more monovinyl units copolymerized therewith comprising:

a. impregnating said fibrous material or film with a minor quantity of an organic antioxidant capable of moderating the oxidative cross-linking reaction of adjoining acrylic molecules by contact with a solution of said organic antioxidant in a solvent incapable of dissolving said fi-

brous material or film having a temperature of about 0° to 100° C. while preserving the original configuration of said fibrous material or film substantially intact, with said organic antioxidant being provided in said solution in a concentration of about 0.2 to 20 percent by weight based upon the total weight of the solution,

b. drying said fibrous material or film to substantially remove said solvent therefrom and to form an acrylic fibrous material or film having incorporated therein about 1 to 10 percent by weight based upon the weight of said acrylic polymer of said organic antioxidant, and

c. heating said resulting impregnated and dried fibrous material or film in an oxygen-containing atmosphere at a temperature of about 200° to 360° C. until a stabilized fibrous material or film is formed which is black in appearance, retains its original configuration substantially intact and which is non-burning when subjected to an ordinary match flame.

4,004,054

MIXTURE FOR THE MANUFACTURE OF ANTISTATIC FLOOR COVERINGS AND COATINGS

Thaddeus Audykowski, and Kurt Amsler, both of Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 473,548, May 28, 1974, abandoned. This application Apr. 11, 1975, Ser. No. 567,453

Claims priority, application Switzerland, June 15, 1973, 8724/73

Int. Cl.² B05D *3/02*

U.S. Cl. 427—385 R **14 Claims**

1. A process for the manufacture of antistatic floor coverings or coatings, which comprises

a. mixing together, based on the total mixture, 30 to 45 percent by weight of a cold-curing liquid synthetic resin combination, 45 to 70 percent by weight of aluminum grit the particles of which have a length of 0.35 to 1.2 mm; 0 to 30 percent by weight of a pigment; and 0.3 to 1.1 percent bv weight of a thixotropic agent.

b. applying said mixture to a base, and

c. allowing to cure.

4,004,055

INHIBITING STRESS CRACKING

Daniel N. Hess, 4705 Yadkin Drive, Raleigh, N.C. 27609, and Ramon A. Bannister, P.O. Box 593, Sullivan's Island, S.C. 29482

Continuation-in-part of Ser. No. 254,452, May 18, 1972, Pat. No. 3,880,585. This application Apr. 21, 1975, Ser. No. 569,689

Int. Cl.² C23C *1/10*

U.S. Cl. 427—431 **1 Claim**

1. A method of inhibiting stress cracking of stainless steel in a chloride-ion containing fluid environment which comprises, (a) contacting a stainless steel surface with metallic mercury in an amount effective to coat the stainless steel surface, and (b) contacting said mercury-coated stainless steel with said chloride-ion containing fluid environment, whereby stress cracking of said stainless steel surface is inhibited in the presence of said chloride-ion containing fluid environment.

4,004,056

POROUS LAMINATED SHEET

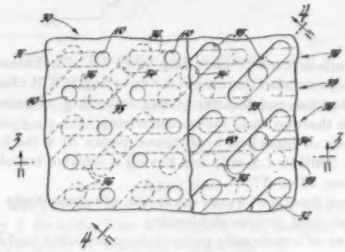
Charles D. Carroll, Greensburg, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed July 24, 1975, Ser. No. 598,963

Int. Cl.² B32B *3/10;* **F23D** *15/02*

U.S. Cl. 428—138 **2 Claims**

1. A laminated porous metal sheet adapted for convection cooling of the sheet by gas flow through the sheet and to provide a shielding turbulent gas flow over a front face of the sheet exposed to a source of heat, the sheet comprising a front layer and a rear layer, the two said layers being in abutting face-to-face relation and being bonded together; the front layer having an outer face constituting the front face of the sheet and an inner face abutting the rear layer, having a multiplicity of rows of separate, short grooves in the inner face with the rows extending generaliy parallel and with the grooves elongated in the direction of the rows, adjacent groups of four grooves being arranged in a rectangular pattern, each groove in said pattern having an inlet into one end of each groove and an outlet hole extending from the other end of each groove through the outer face; the rear layer having an outer face constituting the rear face of the sheet and an inner face abutting the front layer and having a multiplicity of slots in the



inner face, one of said slots communicating with two said inlets disposed in grooves of each of said rectangular pattern and others of said slots communicating with inlets of the remaining grooves in said rectangular pattern and with inlets of grooves formed in adjacent ones of said rectangular patterns to spread coolant flow between said front and rear layers; and the rear layer defining an aperture leading from its outer face into each said slot; so that gas flowing through the sheet from the rear face to the front face is fed through the said apertures, slots, inlets, grooves, and outlet holes, and is discharged from the outlet holes of adjacent rows with substantial inclination to a normal to the front face of the sheet.

4,004,057

GOLD CONDUCTOR COMPOSITIONS

Lewis Charles Hoffman, Hockessin; Charles William McMunn, New Castle; Arthur Harvey Mones, Wilmington, all of Del., and Oliver Alton Short, Hemel Hempstead, England, assignors to E. I. DuPont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 588,131, June 23, 1975, Pat. No. 3,970,590. This application Mar. 12, 1976, Ser. No. 666,496

Int. Cl.² H01B *1/02, 1/06;* **B32B** *15/00*

U.S. Cl. 428—209 **4 Claims**

1. Conductor patterns of a composition of, by weight, 95.0–98.1% gold particles and, complementally, 1.9–5.0% inorganic binder particles, the binder consisting essentially of, by total weight of gold and binder,

0.3–1.5% crystalline PbF_2
0.06–0.32% crystalline Cu_2O
0.2–1.5% crystalline CdO and
0.5–1.95% glass,

the glass having the composition

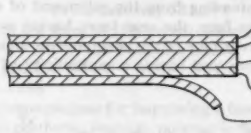
45–52% PbO
3–6% B_2O_3
30–35% SiO_2
4–6% TiO_2
2–4% ZrO_2
0–1% ZnO
1–4% Na_2O
0–4% CdO and
0–2% Li_2O,

adherent to a dielectric substrate.

4,004,058
RE-ENCODING LABEL

Melvin S. Buros, and William B. Buros, both of Phoenix, Ariz., assignors to Micr-Shield Company, Phoenix, Ariz.

Filed July 17, 1975, Ser. No. 596,579
Int. Cl.² B32B 7/12; C09J 7/02
U.S. Cl. 428—215 2 Claims



1. A multi-layered re-encoding label for attachment to an erroneously encoded document for covering MICR characters present thereon and for permitting encoding of new MICR characters thereon, said label comprising:

a. a layer of bleached kraft tissue paper of a thickness of from 1 mil to 1.5 mils and having a relative translucency of from 15 to 57;

b. a layer, from 3 to 4 mils thickness, of substantially unplasticized rigid polyvinylchloride;

c. a layer of low density polyethylene securing said layer of tissue paper to said layer of rigid polyvinylchloride; and

d. a layer of pressure-sensitive adhesive on said rigid polyvinylchloride to permit the adhesive placement of said label on a document.

4,004,059
METHOD TO MAKE FIBROUS MATERIAL OIL AND WATER REPELLENT AT THE SAME TIME

Hans Deiner, Neusass; Bernhard Sandner, Biburg, and Willy Bernheim, Diedorf, all of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Feb. 4, 1975, Ser. No. 547,078
Claims priority, application Germany, Feb. 8, 1974, 2406002
Int. Cl.² D06M 13/18
U.S. Cl. 428—224 9 Claims

1. A process for simultaneously imparting oil-repellency and water-repellency to fibre materials in which the fibre materials are impregnated with a liquor containing a homopolymer, a copolymer or a mixture thereof, having a plurality of perfluoroalkyl groups of at least 4 carbon atoms per alkyl group and a water-repellent agent as extender, dried and heated, the improvement comprising that as extender is used an addition product of (a) an unsaturated compound which is an olefin selected from the group consisting of a vinyl or allyl ester of an aliphatic straight- or branched-chain acid, a vinyl-alkyl ether whose alkyl radical has at least 4 carbon atoms, and allyl-alkyl ether whose alkyl radical has at least 4 carbon atoms, a vinyl halide and mixtures thereof with (b) an organopolysiloxane which contains hydrogen atoms bonded to silicon atoms, the addition product containing on average more than 7 carbon atoms in the alkyl radical and at least 0.20 mole of unsaturated component (a) per gram atom of hydrogen in the siloxane component (b).

4,004,060
BINDING AGENTS

Arie Dick Kardol, Waddinxveen, and Johannes Helmond, Gouda, both of Netherlands, assignors to Emery Industries, Inc., Cincinnati, Ohio

Division of Ser. No. 499,813, Aug. 23, 1974, Pat. No. 3,959,196. This application Aug. 4, 1975, Ser. No. 601,582
Int. Cl.² B32B 27/02, 27/10
U.S. Cl. 428—290 3 Claims

1. A non-woven article comprising a substrate treated with an aqueous solution or dispersion of a binding agent and cured, said binding agent being present in an amount from about 3 to 40% by weight of the substrate and obtained by reacting (a) a dimer, trimer or higher oligomer obtained from the polymerization of unsaturated C_{16}–C_{20} fatty acids with (b) one mole (per carboxyl group) of a diglycidyl ether compound selected of the group consisting of Bisphenol A, Bisphenol F and polyoxypropylene glycol, further reacting (c) about 0.5 to 1.5 mols of an alkoxy polyoxyalkylene compound having terminal alkoxy and hydroxyl groups, a molecular weight from about 200 to 500 and alkylene groups containing 2 or 3 carbon atoms and (d) 0.5 to 1.5 mols of an alkanol amine the alkanol groups of which contain 2 or 3 carbon atoms and finally neutralizing to a pH of 4–9 with a (e) monocarboxylic acid containing 1 to 4 carbon atoms.

4,004,061
ADHESIVES

Gordon Robert Creighton, Cambridge, and Barry James Hayes, Little Eversden, both of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jan. 14, 1974, Ser. No. 433,312
Claims priority, application United Kingdom, Jan. 26, 1973, 4171/73
Int. Cl.² C09J 7/02
U.S. Cl. 428—349 10 Claims

1. A film adhesive which comprises a layer of thermoset resin composition having adhering thereto solid particles of at least 60 μm and at most 1.5 mm of a thermosettable resin composition which is curable at an appreciable rate only at a temperature at least 30° C higher than that at which the thermoset resin composition has been cured.

4,004,062
AQUEOUS POLYESTER COATING COMPOSITION

Marvin A. Peterson, Fort Wayne, Ind., assignor to General Electric Company, Fort Wayne, Ind.

Continuation-in-part of Ser. No. 475,483, June 3, 1974, Continuation-in-part of Ser. No. 467,615, May 6, 1974, Continuation of Ser. No. 822,899, May 8, 1969, abandoned. This application Aug. 30, 1974, Ser. No. 501,932
Int. Cl.² C08L 67/02
U.S. Cl. 428—383 37 Claims

1. A coating composition for application to a substrate from an aqueous solution comprising the admixture of a water soluble film forming polyester resin and a water soluble aromatic oligorthoamic acid di-primary amine.

4,004,063
AQUEOUS ENAMEL FOR COATING MAGNET WIRE

Marvin A. Peterson, Fort Wayne, Ind., and Oliver I. Cline, Burnsville, Minn., assignors to General Electric Company, Fort Wayne, Ind.

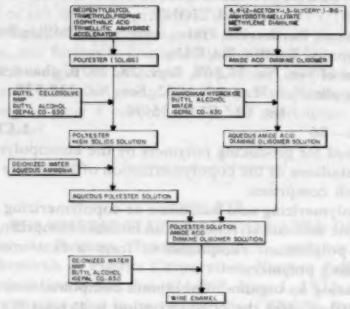
Filed Dec. 31, 1974, Ser. No. 537,650
Int. Cl.² C08L 67/02
U.S. Cl. 428—383 30 Claims

1. A coating composition for application to magnet wire in a wire tower, comprising an aqueous solution of

a. a water soluble polyester resin comprising the reaction product of
neopentylglycol,
trimethylolpropane,
isophthalic acid, and
trimellitic anhydride,
said reactants being in proportions such that the polyester resin has an acid value of between about 45 and about 100, and a hydroxyl value of between about 150 to about 300; and

b. a water soluble orthoamic acid diamine oligomer comprising the reaction product of
m moles methylene dianiline, and
(*m*-1) moles 4,4′-(2-acetoxy-1,3-glyceryl)-bis-anhydrotrimellitate, where *m* has a value of from 2 to 7;

a coating of said aqueous solution on a wire substrate being



curable upon the application of heat to form magnet wire having a cured resin coating thereon.

4,004,064

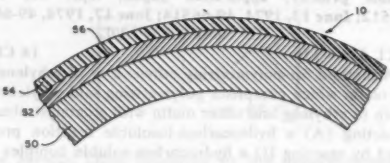
PROTECTIVE COATING FOR ARTICLES

Saul Kessler, Canoga Park, Calif., assignor to Joseph W. Aidlin, Los Angeles, Calif.

Division of Ser. No. 429,911, Jan. 2, 1974, which is a continuation-in-part of Ser. No. 137,429, April 26, 1971, abandoned. This application May 22, 1975, Ser. No. 579,777

Int. Cl.² B32B *9/04, 27/00*

U.S. Cl. 428—421 **18 Claims**



1. A protectively coated article comprising in combination:

a metal substrate; and

a low-friction waxy, continuous, coherent film having a decomposition temperature of at least 575° F adherent to a surface of said substrate comprising the reaction product of a chloride, bromide or iodide of a metal selected from aluminum, boron or titanium and a mononuclear -arylamine containing an alkyl group containing from 1–5 carbon atoms and having three fluorine atoms attached to the terminal carbon atom.

4,004,065

COATED HEAT SENSITIVE RECORDING MEMBER

Hiromu Matsushita, Habikino; Takashi Yamahata, Koriyama, and Hiroshi Kakimoto, Kyoto, all of Japan, assignors to General Company, Ltd., Osaka, Japan

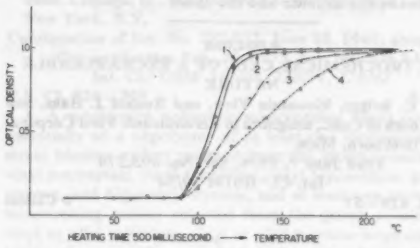
Filed Dec. 24, 1974, Ser. No. 536,326

Claims priority, application Japan, Dec. 13, 1974, 49-142440

Int. Cl.² B32B *23/06, 23/08*

U.S. Cl. 428—532 **13 Claims**

1. In a heat sensitive recording member which comprises a support and a heat sensitive layer overlying said support, said heat sensitive layer being composed of a binder having dispersed therein an iron salt of a higher fatty acid and gallic acid as the color forming components which react with each other to provide a color upon the application of heat thereto; the improvement wherein said heat sensitive layer comprises, dispersed in said binder, in addition to said color forming components, a stilbene series fluorescent dye which inhibits said reaction prior to the use of said recording member, and wherein said binder is at least one member selected from the



group consisting of hydroxypropyl cellulose and hydroxypropyl methylcellulose.

4,004,066

METHOD OF PROTECTING CONCRETE

Anthony J. DeArdo, New Kensington, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Aug. 6, 1975, Ser. No. 602,266

Int. Cl.² B32B *9/04*

U.S. Cl. 428—538 **4 Claims**

1. A method of protecting cured concrete from attack by organic lubricants which comprises treating the cured concrete for at least 1 hour with an aqueous solution of citric acid having a concentration of from 0.1% to 5% by weight.

4,004,067

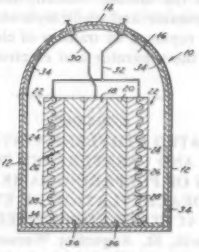
RECHARGEABLE ELECTROCHEMICAL CELL

Donald C. Briggs, Mountain View, and Ronald J. Haas, San Jose, both of Calif., assignors to Aeronutronic Ford Corporation, Dearborn, Mich.

Filed June 7, 1976, Ser. No. 693,573

Int. Cl.² H01M *10/34*

U.S. Cl. 429—57 **5 Claims**



1. In a rechargeable electrochemical cell including a closed container confining therewithin at least a cathode, a gas generating and consuming anode, a separator and electrolyte storage material between the cathode and the anode, an electrolyte in the storage material and an open volume for gas storage, the improvement which comprises:

lining the inside surface of the closed container defining the open volume for gas storage with a layer of a capillary mat material, said lining of said capillary mat material having at least a portion thereof in liquid transfer contact with the separator and electrolyte storage material located between the cathode and the anode, whereby any electrolyte vaporized into the gas storage volume will condense onto said lining material, and whereby the liquid transfer contact of said lining material and the separator and electrolyte storage material between the

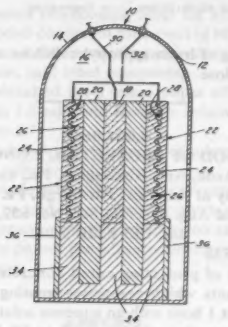
cathode and the anode will provide a liquid flow path for returning vaporized and subsequently condensed electrolyte to the separator and electrolyte storage material between the cathode and the anode.

4,004,068

ELECTROCHEMICAL CELL OF A RECHARGEABLE NATURE

Donald C. Briggs, Mountain View, and Ronald J. Haas, San Jose, both of Calif., assignors to Aeronutronic Ford Corporation, Dearborn, Mich.

Filed June 7, 1976, Ser. No. 693,574
Int. Cl.² H01M *10/34*
U.S. Cl. 429—57 **6 Claims**



1. In a rechargeable electrochemical cell including a closed container confining therewithin at least a cathode, a gas generating and consuming anode, a separator and electrolyte storage material between the cathode and the anode, an electrolyte in the storage material and an open volume for gas storage, the improvement which comprises:

providing within the closed container a reservoir formed of a capillary mat material capable of storing electrolyte, said reservoir being in liquid transfer contact with the separator and electrolyte storage material between the cathode and the anode, whereby losses of electrolyte from the separator and electrolyte storage material are substantially replaced by transfer of electrolyte from said reservoir to the separator and electrolyte storage material.

4,004,069

UNSATURATED ETHYLENE-VINYL ACETATE COPOLYMERS AND UNSATURATED POLYETHYLENES AND METHODS OF PREPARING SAME BY PARTIAL OR EXHAUSTIVE DEACETYLATION OF ETHYLENE-VINYL ACETATE COPOLYMERS

Günther Bernhardt, St. Augustin; Werner Trautvetter, and Rudeger Minke, both of Troisdorf, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf Bez. Cologne, Germany

Filed Oct. 30, 1974, Ser. No. 519,906
Claims priority, application Germany, Nov. 6, 1973, 2355320; Dec. 17, 1973, 2362664
Int. Cl.² C08F *210/02, 218/08, 8/50*
U.S. Cl. 526—48 **24 Claims**

1. Method of deacetylation of ethylene-vinyl acetate copolymers to produce the corresponding olefinically unsaturated, linear polymers which comprises deacetylating ethylene-vinyl acetate copolymers in presence of a catalist for the deacetylation under a vacuum of less than about 50 Torr, by splitting acetic acid from the copolymers while continuously stirring the copolymers wherein the deacetylation is performed at a temperature of about 160° – 350° and wherein said catalyst is a Lewis acid or a protonic acid: and removing acetic acid from the copolymers.

4,004,070

VISCOSITY REDUCTION OF ORGANOPOLYLITHIUM-INITIATED POLYMER SOLUTIONS

Ralph C. Farrar, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation of Ser. No. 76,209, Sept. 28, 1970, abandoned. This application Mar. 27, 1972, Ser. No. 238,538
Int. Cl.² C08F *36/06*
U.S. Cl. 526—86 **1 Claim**

1. A method for producing polymers by the homopolymerization of butadiene or the copolymerization of butadiene and styrene which comprises:

a. homopolymerizing said butadiene or copolymerizing said butadiene and said styrene with an initiator comprising an organo-polylithium compound to form a first mixture comprising polymers.

b. introducing an organo-monolithium compound into said first mixture after the polymerization is at least 80 percent complete to form a second mixture comprising polymers;

c. then introducing silicon tetrachloride coupling agent into said second mixture to couple said polymer; and,

d. recovering said polymers.

4,004,071

PROCESS FOR THE POLYMERIZATION OF ETHYLENE

Itsuho Aishima, Fujisawashi; Hisaya Sakurai, Kurashikishi; Yukichi Takashi, Kurashikishi; Hideo Morita, Kurashikishi; Tadashi Ikegami, Kurashikishi, and Toshio Sato, Kurashikishi, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Apr. 17, 1975, Ser. No. 569,044
Claims priority, application Japan, Apr. 30, 1974, 49-47512; June 13, 1974, 49-66514; June 17, 1974, 49-68135
Int. Cl.² C08F *4/66, 10/02*
U.S. Cl. 526—116 **14 Claims**

1. A method for polymerizing ethylene or of ethylene and other olefin which comprises polymerizing said ethylene or a mixture of ethylene and other olefin with a catalyst obtained by reacting (A) a hydrocarbon-insoluble reaction product formed by reacting (i) a hydrocarbon-soluble complex containing Al and Mg, represented by the general formula

$$Al_\alpha Mg_m R^1_{n(2-} \quad {}_)R^2_{2m}H_\alpha$$

wherein R^1 and R^2 are same or different hydrocarbon radicals having 1 to 10 carbon atoms; n and *m* are numbers each greater than 0; m/n is in the range of 0.5–10; and α is 0 or 1, with (ii) at least one compound selected from the group consisting of titanium compounds and vanadium compounds both containing at least one halogen atom, with (B) a trialkylaluminum or a dialkylaluminum hydride wherein the alkyl radicals have 1 to 20 carbon atoms.

4,004,072

PROCESS FOR PRODUCING ACRYLONITRILE POLYMERS

Hitoshi Tamura, Otake, Japan, assignor to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Division of Ser. No. 460,678, April 15, 1974, Pat. No. 3,915,942. This application Mar. 26, 1975, Ser. No. 562,133
Claims priority, application Japan, May 1, 1973, 48-49397
The portion of the term of this patent subsequent to Oct. 28, 1992, has been disclaimed.
Int. Cl.² C08F *120/44, 220/44*
U.S. Cl. 526—214 **2 Claims**

1. The acrylonitrile homopolymer or copolymer prepared by the process which comprises polymerizing acrylonitrile or a mixture comprising at least 85% by weight of acrylonitrile and at most 15% by weight of other copolymerizable monoethylenically unsaturated compounds in an aqueous medium at 30° C to 70° C at a pH of 1.5 – 5.0, wherein the monomer to water ratio is 1/10 to ⅓, in contact with a redox catalyst comprising

nitrous acid or a salt thereof and sulfurous acid or salt thereof, wherein the ratio of said nitrous acid or salt to said sulfurous acid or salt thereof is 1/30 to ½ by weight, and the sulfurous acid or salt thereof is present in an amount of 1/10,000 to 1/50 by weight, based on the amount of water in the aqueous medium, and further in contact with 0.005%–5% by weight based on the weight of monomer of a water insoluble mercaptan selected from the group consisting of alkyl mercaptans containing at least 4 carbon atoms and mercaptan carboxylate acid ester.

4,004,073

POLYMERIC FLUOROMETHYLATED DIENES

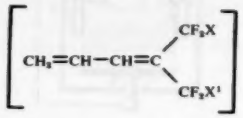
Victor A. Pattison, Tonawanda, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation of Ser. No. 411,869, Nov. 1, 1973, abandoned, and a continuation-in-part of Ser. No. 788,009, Dec. 30, 1968, abandoned. This application Feb. 9, 1976, Ser. No. 656,219

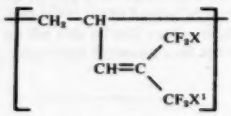
Int. Cl.² C08F *136/16, 136/18*

U.S. Cl. 526—252 **5 Claims**

1. Homopolymers of halomethylated dienes of the formula



wherein X and X′ are halogen and wherein said homopolymers are characterized by the repeating units



in the skeletal chain produced by the process comprising allowing said halomethylated dienes to polymerize by the use of a free radical catalyst.

4,004,074

HIGHLY SUBSTANTIVE SUNSCREENING AGENTS

John Fred Gerecht, Somerville, N.J., and Morton Batlan Epstein, Chicago, Ill., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 737,822, June 18, 1968, abandoned. This application Feb. 28, 1973, Ser. No. 336,839

Int. Cl.² C08F *218/04, 220/54, 228/02*

U.S. Cl. 526—305 **8 Claims**

1. A substantive polymeric sunscreening agent consisting essentially of a copolymer of at least one monomeric, substrate binding moiety selected from the group consisting of, vinyl mercaptan, vinyl guanidine, vinyl biguanidine, guanidyl styrene, and biguanidyl styrene, and at least one monomeric sunscreening moiety selected from the group consisting of vinyl or allyl salicylate, vinyl or allyl p-amino-benzoate, allyl amide of p-amino benzoic acid, allyl amide of salicylic acid, and p-allylamino benzoic acid.

4,004,075

PACKAGING FILMS

Michael Hugh Richmond, Sarnia, Canada, and Henry Glyn Wright, Signal Mountain, Tenn., assignors to Polysar Limited, Sarnia, Canada

Continuation-in-part of Ser. No. 408,680, Nov. 27, 1972. This application Feb. 27, 1975, Ser. No. 553,816

Claims priority, application Canada, Nov. 27, 1972, 157570

Int. Cl.² C08F *220/44, 210/00, 210/08*

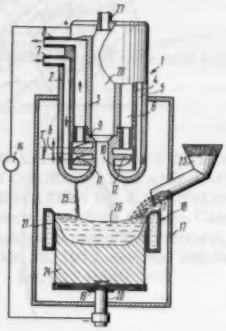
U.S. Cl. 526—342 **3 Claims**

1. Molded or extruded articles comprising oriented film formed by extruding an interpolymer at a temperature between 180° C and 250° C, said film being bonded to one or more sheets of one of polystyrene or paper, metal foil or glass, said interpolymer consisting essentially of (1) 60 to 75 weight percent of acrylonitrile, (2) 12.5 to 20 weight percent of styrene and (3) 12.5 to 20 weight percent is isobutylene, the amounts of (2) and (3) being within the weight ratio lf 1.3:1 to 1:1.3, said interpolymer being substantially free of homopolymer and having a permeability to carbon dioxide of less than 7cc/100 sq. inch. 24 hours . atmos. mil at 73° F, permeability to oxygen of less than 3cc/100 sq. inch . 24 hours . atmos . mil at 73° F and water vapor transmission of less than 4g/100 sq. inch. 24 hours . mil at 95 percent relative humidity.

4,004,076
NONCONSUMABLE ELECTRODE FOR MELTING METALS AND ALLOYS

Boris Evgenievich Paton, ulitsa Kotsjubinskogo, 9, kv. 21; Viktor Iosifovich Lakomsky, ulitsa Anri Barbjusa, 22/26, kv. 119; Vladimir Nikolaevich Kostyakov, ulitsa Zhelyabova, 10, kv. 56; Vitaly Mikhailovich Shian, ulitsa Borodyanskaya, 12, kv. 58; Alfred Iosifovich Bukalo, ulitsa P. Zaporozhtsa, 8/2, kv. 69; Jury Vladimirovich Lisovoi, ulitsa Sovetskaya, 24, and Valentin Petrovich Domrachev, ulitsa Gvardeiskaya, 10, kv. 1, all of Kiev, U.S.S.R.

Filed June 6, 1975, Ser. No. 584,495
Int. Cl.[2] H05B 7/08
U.S. Cl. 13—18 2 Claims

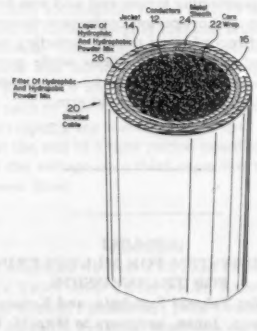


1. A nonconsumable electrode for melting metals and alloys, comprising: a cooled housing connected to a supply source; a cooled tip having a cavity defined by inner and outer walls of said tip; said inner walls having at least one threaded groove provided on the side of said cavity, said groove serving to rotate the arc generated between said tip and the molten metal and alloy.

4,004,077
WATER BLOCKED ELECTRIC CABLES

Leo Victor Woytiuk, Pointe-Claire, Quebec, Canada, assignor to Northern Electric Company Limited, Montreal, Canada

Filed Mar. 7, 1975, Ser. No. 556,294
Int. Cl.[2] H01B 7/28
U.S. Cl. 174—23 C 2 Claims

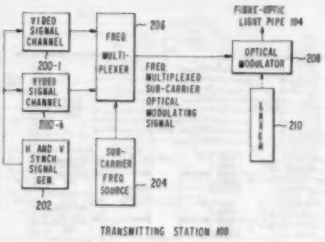


1. An electric cable having a core of a plurality of conductors and a jacket, the interstices between the conductors and within the jacket being at least partially filled with a mixture of a hydrophobic and a hydrophilic powder, the hydrophilic powder forming on contact with water a viscous, non-swelling material, the conductors being each coated with a hydrophobic oil.

4,004,078
OPTICAL COMMUNICATION AND DISPLAY SYSTEM

Istvan Gorog, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Jan. 24, 1974, Ser. No. 436,038
Int. Cl.[2] H04B 9/00
U.S. Cl. 358—83 3 Claims



1. In a system of the type in which deflecting means scans a light beam applied thereto, which light beam is intensity-modulated with video information manifesting a given scene, comprising translating means coupled to said deflecting means and responsive to received light wave energy from a remotely located source applied as an input thereto which light wave energy as received is modulated in some given form with a video signal manifesting both said given scene and sync signals for synchronizing the scan of said deflecting means, said translating means including means for employing said received light wave energy as the wave energy of said light beam, obtaining said intensity modulation of said light beam from said given form of modulation of said received light wave energy, and separating said sync signals from said received light wave energy and applying them to said deflecting means to synchronize the scan thereof, the improvement:

wherein said given form of modulation comprises a subcarrier modulated by the video signal of said light wave energy, the entire bandwidth of said modulated sub-carrier being above the highest baseband frequency component of said video signal itself, and wherein said translating means comprises means including a photodetector for demodulating only a portion of said light wave energy, an electro-optic modulator having the remainder of said light wave energy applied as an input thereto, means coupled to said photodetector including a sub-carrier detector responsive to the output of said photodetector for reducing said video signal to baseband, sync separator means for removing said sync signals from said baseband video signal, said baseband video signal being applied as a modulating signal to said electro-optic modulator and said separated sync signals being applied to said deflecting means to synchronize the scan thereof, the output from said electro-optic modulator constituting said light beam applied to said deflecting means.

4,004,079
METHOD AND APPARATUS FOR DUAL RESOLUTION PHOTOGRAPHIC REPRODUCTION OF LINE AND CONTINUOUS TONE GRAPHIC MATERIALS

William Thomas Boston, Melrose, Mass., assignor to Optronics International, Inc., Chelmsford, Mass.

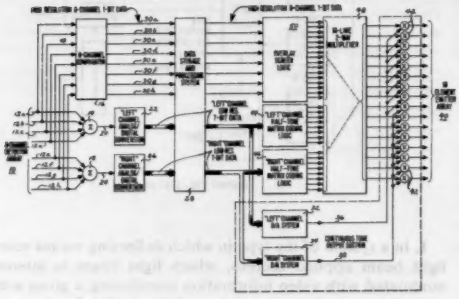
Filed Nov. 14, 1975, Ser. No. 632,015
Int. Cl.[2] H04N 1/26
U.S. Cl. 358—256 12 Claims

1. A method for reproducing line and continuous tone, graphic material comprising the steps of:

1. opto-electrically scanning incremental areas of line and continuous tone graphic material and producing high resolution line graphic signals representative of the gray levels of incremental areas of the scanned line graphic

materials and low resolution continuous tone graphic signals representative of the gray levels of incremental areas of the scanned continuous tone graphic material;

2. photographically reproducing the line graphic material by scan exposing a photosensitive member in response to the high resolution line graphic signals to produce an exposure of the photosensitive member that is a function



of the gray levels of the scanned line graphic material; and,

3. photographically reproducing the continuous tone graphic material by scan exposing a photosensitive member in response to the low resolution continuous tone graphic signals to produce an exposure of the photosensitive member that is a function of the gray levels of the scanned continuous tone graphic material.

4,004,080

METAL COATING FOR VIDEO DISCS

John L. Vossen, Jr., Bridgewater, N.J.; Frederick Russell Nyman, Carmel, Ind.; Dennis Glendon Fisher, Titusville, N.J., and George Frederick Nichols, Oaklandon, Ind., assignors to RCA Corporation, New York, N.Y.

Filed July 25, 1975, Ser. No. 599,129

Int. Cl.² H04N *1/28*; B32B *3/02*

U.S. Cl. 358—128 **8 Claims**

1. In a capacitive video frequency recording means in the shape of a disc having a spiral groove on a face thereof and video information in the form of geometric variations in said groove, said disc having a thin conductive layer on said face and a thin dielectric layer disposed on said conductive layer, the improvement which comprises employing as the conductive layer a pseudo-alloy about 200 to 400 angstroms thick of an alloy containing from about 65 to about 80 percent by weight of nickel, from about 10 to about 30 percent by weight of chromium and from 0 to about 10% by weight of iron, which pseudo-alloy contains from about 10 to about 15 atomic percent of copper, and from about 10 to 25 atomic percent of oxygen, wherein atomic percent is determined by Auger electron spectroscopy.

5. A thin, conductive, corrosion-resistant metal film which comprises a pseudo-alloy of an alloy containing from about 65 to about 80% by weight of nickel, from about 10 to about 30% by weight of chromium, and from 0 to about 10% by weight of iron, which pseudo-alloy contains from about 10 to about 25 atomic percent of oxygen and from about 10 to about 15 atomic percent of copper, wherein atomic percent is determined by Auger electron spectroscopy, said film being from about 200 to 400 angstroms thick.

4,004,081

OPTICAL VIDEODISC PICKUP ARM WITH MOVING COIL DRIVE MEANS

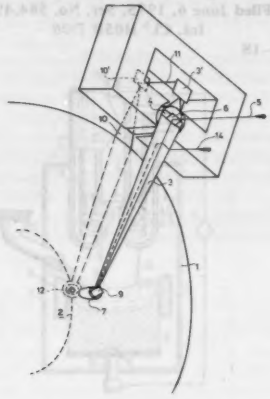
Karl-Ludwig Zorn, Berlin, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed June 6, 1974, Ser. No. 477,476

Claims priority, application Germany, July 20, 1973, 2337015

Int. Cl.² H04N *5/76*

U.S. Cl. 358—128 **5 Claims**



1. Optical pickup apparatus for a videodisc record arranged to be rotated on the disc axis, comprising:

an electromagnetic torque-producing transducer arranged to produce torque on an axis parallel to said disc record axis;

an arm movable by said torque-producing transducer in a manner for moving the end of said arm farthest from said transducer in a path approximately perpendicular to a record trace on said disc record;

a focusing light beam projection means on said end of said arm for projecting a spot of light on a record trace on said record;

means for detecting light from said beam, as modified by said record trace, and

means for positioning said detecting means near the portion of said record trace illuminated by said light spot, including mechanical partial decoupling means interposed between said positioning means and said arm for preventing transmission of short period correction movements crossways of said record trace to said detecting means except as smoothed gradual corrections while permitting said detecting means to follow a tracking movement, as gradually corrected, produced by said arm.

4,004,082

METHOD AND SYSTEM FOR MULTIPLEXING SIGNAL FOR TRANSMISSION

Yasufumi Yumde; Takashi Furuhata, and Kotaro Kawamura, all of Yokohama, Japan, assignors to Hitachi, Ltd., Japan

Filed Sept. 30, 1974, Ser. No. 510,630

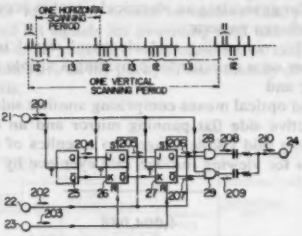
Claims priority, application Japan, Oct. 1, 1973, 48-109275

Int. Cl.² H04N *7/12*; H03K *1/17*, *7/00*

U.S. Cl. 358—141 **13 Claims**

5. A method of multiplexing for the transmission of at least two kinds of information signals comprising the steps of providing a two-polarity pulse train consisting of pulses of alternately inverted polarities modulated by a first kind of said

information signal, and controlling the polarity of a part of the pulses in said modulated pulse train signal by said information



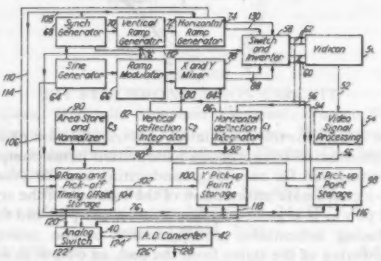
signal of a second kind to thereby code such part of said pulse train signal.

4,004,083

METHOD AND APPARATUS FOR DETERMINING CENTROID COORDINATES AND ANGULAR ORIENTATION OF A SURFACE

Philip Chrislock Norem, Fort Erie, Ontario, Canada, assignors to Autotelic Industries, Incorporated, Ontario, Canada

Filed Oct. 25, 1972, Ser. No. 280,548
Int. Cl.² H04N 7/18
U.S. Cl. 358—125 **33 Claims**



29. The method of locating the centroid of a surface which comprises: electronically scanning said surface with scan lines in a substantially rectangular raster pattern larger in all directions than said surface, charging first and second capacitors by supplying thereto voltage signals representative respectively of the vertical and horizontal frame voltages of each line during the period of incidence of the line on the surface, discharging each of said capacitors through a respective resistor, and interrupting the discharging of said first and second capacitors at the end of a time period equal to the time period required for the voltage on a third capacitor to reach a predetermined lower level.

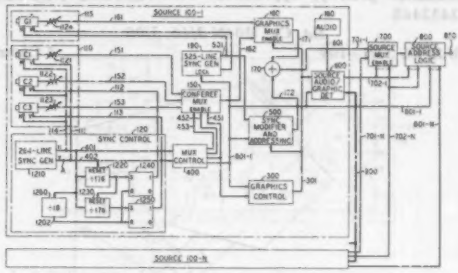
4,004,084

VIDEO CONFERENCING SYSTEM USING SPATIAL REDUCTION AND TEMPORAL RESOLUTION

Earl Franklin Brown, Piscataway; John Ormond Limb, Tinton Falls, and Birendra Prasada, Matawan, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 3, 1976, Ser. No. 663,622
Int. Cl.² H04N 7/12, 7/18
U.S. Cl. 358—133 **11 Claims**

1. In a video conferencing system, apparatus for reducing bandwidth of a plurality of video pictures; each picture having one or more fields, each picture being provided by a corresponding one of a plurality of video cameras, and each picture for display on a corresponding one of a plurality of video monitors; said apparatus including means for spatially reducing a picture from a first group of one or more cameras, said spatial reduction means including means for providing a spatial portion of said picture from said first group of cameras, said spatial portion being less than the total raster of a picture



and characterized in that said apparatus further comprises:

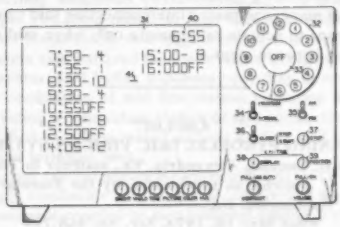
temporal resolution means operative upon said picture from said first group of cameras, said temporal resolution means including means for interleaving each picture in said first group in a prefixed rotational sequence.

4,004,085

RECEIVING PROGRAM-PRESETTING SYSTEM FOR A TELEVISION RECEIVER

Shinichi Makino, Fujisawa, and Naoyuki Kokado, Tokyo, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Apr. 14, 1975, Ser. No. 567,870
Claims priority, application Japan, Apr. 19, 1974, 49-43466
Int. Cl.² H04N 7/18
U.S. Cl. 340—324 AD **5 Claims**



1. A television receiver program-presetting system for displaying items of program information on the face of a television receiver Braun tube, said system comprising:

a. means for supplying items of program information;

b. memory means for storing each of said items of program information in a designated address;

c. means for designating the instantaneous vertical position on said Braun tube being scanned by said television receiver;

d. address encoder means for generating a plurality of unique display region signals in response to said vertical position, each of said display region signals representing one area on the face of said Braun tube;

e. means for removing an item of program information from an address of said memory means corresponding to one of said display region signals;

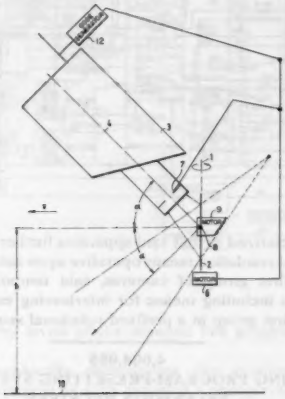
f. means for producing signals denoting character patterns corresponding to said removed item of program information; and

g. means for delivering said character patterns to said area of said Braun tube represented by said one display region signal.

4,004,086
APPARATUS FOR THE TELEVISION RECONNOITERING OF TERRAIN FROM THE AIR

Karl-Bernd Buss, Nuremberg, Germany, assignor to GRUNDIG E.M.V. Elektro-Mechanische Versuchsanstalt Max Grundig, Fuerth, Germany

Filed Mar. 28, 1975, Ser. No. 562,818
Claims priority, application Germany, July 6, 1974, 2432448
Int. Cl.² H04N 3/16, 3/00
U.S. Cl. 358—109 3 Claims

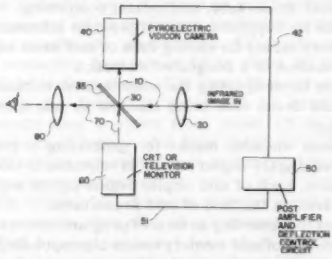


1. An apparatus for reconnoitering terrain from a moving aircraft flying parallel to the terrain under observation comprising: a mirror arranged nominally perpendicular to the object plane of the terrain under observation; means for stepwise tilting said mirror about an axis perpendicular to said object plane, whereby to define an arc by a series of steps, a television camera having an optic axis directed at said mirror, said optic axis being inclined at an angle and with respect to said object plane, and means interconnecting said camera and tilting means to actuate said camera only when said mirror is in position between steps.

4,004,087
PANNING PYROELECTRIC VIDICON SYSTEM

Reinhard D. Ennulat, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 10, 1974, Ser. No. 468,725
Int. Cl.² H04N 5/38
U.S. Cl. 358—113 4 Claims


PYROELECTRIC VIDICON CAMERA
INFRARED IMAGE IN
CRT OR TELEVISION MONITOR
POST AMPLIFIER AND DEFLECTION CONTROL CIRCUIT

1. In a pyroelectric vidicon panning system for thermal imaging:

a first optical means comprising an infrared objective lens and one side of a two reflective side flat panning mirror for panning a still infrared image across a pyroelectric retina of a vidicon for producing a charge pattern therefrom;

means for generating an electrical signal in accordance with said charge pattern;

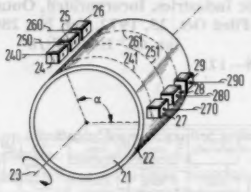
means for converting said electrical signal into a visible display on a monitor for providing a visible image therefrom; and

a second optical means comprising another side of said two reflective side flat panning mirror and an eyepiece for panning said visible image into a replica of said infrared image for viewing through said eyepiece by an observer.

4,004,088
SYSTEM FOR THE FORMULATION AND TRANSMISSION OF COORDINATE INFORMATION TO REPRODUCE HANDWRITTEN ITEMS

Walter Heywang, Neukeferloh, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Aug. 7, 1975, Ser. No. 602,555
Claims priority, application Germany, Aug. 22, 1974, 2440326
Int. Cl.² G08C 21/00
U.S. Cl. 178—18 6 Claims



1. A system for the formulation and transmission of coordinate information to reproduce handwritten items comprising:

a writing pad for receiving handwriting and for producing *x-y* coordinate information of the location of the stylus of a pen as it is guided by hand across the pad and for producing information corresponding to the raising and lowering of the stylus from the pad, an output printer for utilizing the *x-y* coordinate information for reproducing the handwriting and which utilizes the raising and lowering information for raising and lowering the printer head and for moving the printer head over the recording material, means for delaying the *x-y* coordinate information for a fixed time interval and for providing said delayed information to said output printer, means for supplying *x-y* coordinate information corresponding to the commencement of a new item of data without delay to said printer at a time corresponding substantially to the instant that the printer is raised from the recording material after executing a given item of handwriting.

4,004,089
PROGRAMMABLE CRYPTIC DEVICE FOR ENCIPHERING AND DECIPHERING DATA

Harold S. Richard, Dayton; Eugene L. Grillmeier, Centerville; Jack R. Gross, Waynesville, and Robert P. Myers, Kettering, all of Ohio, assignors to NCR Corporation, Dayton, Ohio

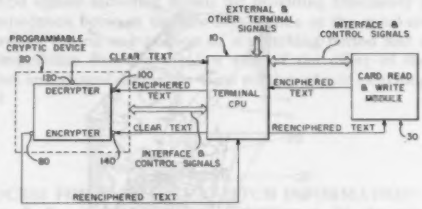
Filed Feb. 28, 1975, Ser. No. 553,955
Int. Cl.² H04L 9/00
U.S. Cl. 178—22 6 Claims

1. An encryptor for encoding a string of data bits comprising in combination:

a. register means for generating a pseudo-random bit sequence;

b. non-linear generator means comprising logic means for sequentially receiving portions of the pseudo-random bit

sequence and for logically combining bits from the portions of the received pseudo-random bit sequence to provide a plurality of combined bit signals, and parity generator means connected to receive said plurality of combined bit signals for providing said non-linear pseudo-random bit sequence with each bit of said sequence being indicative of the parity of the plurality of combined bit signals;



c. combining means for combining the data bits of said string of data bits with bits of said non-linear pseudo-random bit sequence to provide a partially encoded signal; and

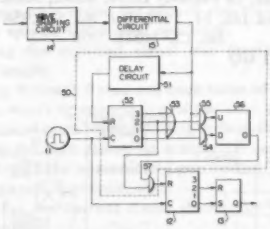
d. shuffle means for receiving said partially encoded signal and for shuffling the bit positions of said partially encoded signal to provide an encoded signal.

4,004,090

BIT SYNCHRONIZATION CIRCUIT

Akio Goto, Hachioji; Shigenori Okamoto, Tama; Shigeru Asakawa, Fujisawa, and Fumio Sugiyama, Yokohama, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Tokyo, Japan

Filed Jan. 23, 1976, Ser. No. 651,778
Claims priority, application Japan, Jan. 24, 1975, 49-10343
Int. Cl.² H04L *7/00*
U.S. Cl. 178—69.1 **4 Claims**



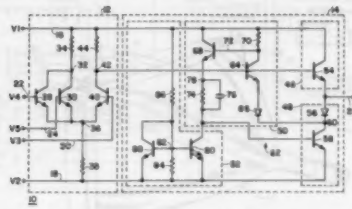
1. A bit synchronization circuit which comprises a pulse generator for producing a pulse in response to a data signal received; a clock pulse oscillator for generating a clock pulse having a frequency which is an integral multiple of the data speed of said data signal; a synchronization-controlling circuit supplied with outputs from said pulse generator and clock pulse oscillator to produce a signal with a specified phase relative to a pulse delivered from said pulse generator; a first ring counter whose reset terminal is supplied with an output from said synchronization-controlling circuit and which issues a first and a second output signal corresponding to the content **0** and any other content than **0** in response to clock pulses from said clock pulse oscillator; and a flip-flop circuit supplied with the first and second outputs from said first ring counter to produce a pulse synchronous with the data signal received.

4,004,091

BIDIRECTIONAL LINE DRIVER

Robert Russell Marley, Phoenix; Paul Andrew Nygaard, Mesa, and Walter Christian Seelbach, Scottsdale, all of Ariz., assignors to Motorola, Inc., Chicago, Ill.

Filed June 26, 1975, Ser. No. 590,534
Int. Cl.² H04L *25/20*
U.S. Cl. 178—70 R **6 Claims**



1. A bidirectional line driver circuit comprising:

a. input circuit means, said input circuit means having an output node and said input circuit means responsive to an input logic signal;

b. first output switching means comprising a first transistor having an emitter electrode coupled to the line driver output terminal, a collector electrode coupled to a first power supply conductor, and a base electrode coupled to said output node;

c. second output switching means coupled to a second power supply conductor and coupled to said line driver output terminal;

d. buffered feedback means coupled to said input circuit and coupled to said first output switching means via said output node and coupled to said second output switching means, said buffered feedback means responding to conduction of said first output switching means to effect nonconduction in said second output switching means and responding to nonconduction of said first output switching means to effect conduction in said second output switching means at high speeds in response to a signal transition at said logic input of said input circuit, wherein said buffered feedback means comprises a buffer transistor, said buffer transistor operating in response to the conduction of said first output switching means for providing a conduction replica of said conductive state of said first switching means without loading said line driver output terminal; and

e. constant current source means coupled to said first power supply conductor and to said second power supply conductor and coupled to said buffered feedback means.

4,004,092

COLOR TELEVISION PICTURE TUBES WITH IMPROVED IMPLOSION PROTECTION SYSTEM

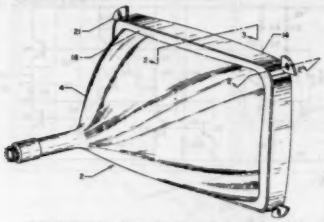
Melvin F. Rogers, Western Springs, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Oct. 20, 1975, Ser. No. 623,852
Int. Cl.² H01J *29/87*
U.S. Cl. 358—246 **4 Claims**

1. A color television picture tube having a glass bulb with an approximately rectangular, flangeless, curved faceplate having a convex front surface through which television pictures are viewed, a concave rear surface with a phosphor screen deposited on a portion thereof, and a peripheral edge surface connecting the convex front surface and the concave rear surface of the faceplate, the peripheral edge surfaces being contoured that is, having sides which depart from and return to a plane connecting the four corners of the faceplate, the glass bulb also having a funnel having a convex seal land which mates with the concave inner surface of the faceplate to define a contoured sealing interface, said bulb when impacted on

said faceplate being most susceptable to fracture near the center of the sides thereof, said tube including a low cost edgebond implosion protection system comprising:

a high tensile strength metal frame which surrounds said edge surface of said faceplate and which overlies a portion of said funnel so that a wedge shaped gap is formed around the bulb between said frame and said portion of said funnel wherein the front-to-back frame depth increases to a maximum at the center of the sides; and



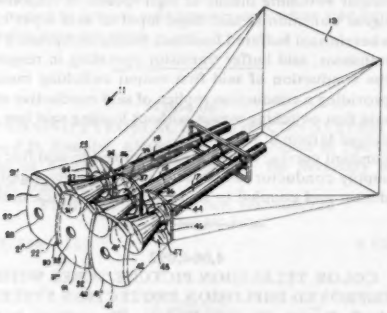
a cement between said frame and said bulb, said cement and said frame binding up said edge surface of said faceplate, whereby said system providing a maximum overlay of said funnel and a maximum volume of said cement at the center of the sides of said funnel provides greatest implosion protection at portions of said tube where greatest protection is needed.

4,004,093

TRUNCATED SCHMIDT OPTICAL SYSTEMS FOR PROJECTING COLOR TELEVISION PICTURES

Bradley H. Oland, Oakland, Calif., assignor to Tinsley Laboratories, Inc., Berkeley, Calif.

Filed Dec. 12, 1975, Ser. No. 640,177
Int. Cl.² H04N *5/74, 9/31*
U.S. Cl. 358—60 **8 Claims**



1. A compact Schmidt optical system for projecting color television pictures from cathode ray tubes onto a screen comprising,

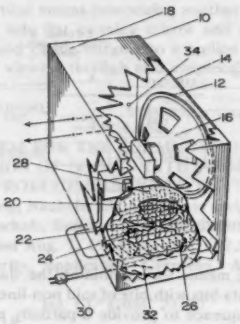
a plurality of individual Schmidt optical systems adjacently clustered together, each Schmidt optical system comprising, (a) a curved mirror positioned for receiving an image from a respective cathode ray tube and projecting said images toward a screen for common registration with other projected images, and (b) a corrector lens spaced between the curved mirror and the screen, said corrector lens shaped to reduce spherical aberration in said image, each adjacent curved mirror and each adjacent corrector lens having adjacent parallel edges, said edges being chords truncating mirror and lens bodies to permit clustering of adjacent Schmidt optical systems.

4,004,094

ENCLOSURE SYSTEM FOR SOUND GENERATORS

James H. Ott, Akron, Ohio, assignor to Novar Electronics Corporation, Barberton, Ohio

Filed Mar. 16, 1976, Ser. No. 667,351
Int. Cl.² H04R *1/02*
U.S. Cl. 179—1 E **8 Claims**



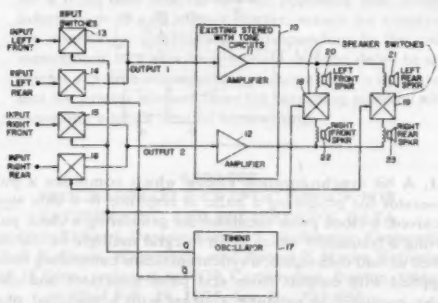
1. An improved sound production apparatus of the type having a less than perfectly sealed enclosure with an interior space and a port formed in a wall thereof and having a vibratorily driven membrane mounted at said port, wherein the improvement comprises a displaceable-walled container formed within said interior space, said container having an expansible and contractable volume and containing a composition of matter having an equilibrium state between a gas phase and another phase, said composition of matter has an average gas/liquid phase equilibrium at atmospheric pressure and wherein there is further provided a heat transferring means including a sensing means and a control means for maintaining said composition of matter at an equilibrium wherein there is a substantial volume of gas phase which is greater than the maximum volume displacement of said membrane.

4,004,095

SYSTEM FOR TIME SHARING AN AUDIO AMPLIFIER

Vincent Cardone, 28 Peabody Drive, Stowe, Mass. 01775

Filed Jan. 14, 1975, Ser. No. 540,954
Int. Cl.² H04R *5/00*
U.S. Cl. 179—1 GQ **10 Claims**



1. A circuit arrangement for time sharing at least one amplifier and at least two speakers, said arrangement having a first and second low level audio signal being supplied thereto, said circuit arrangement comprising means interposed between said first and second low level signals for supplying a first and second gating signal of opposite phase; means responsive to the first gating signal and first low level signal for gating said

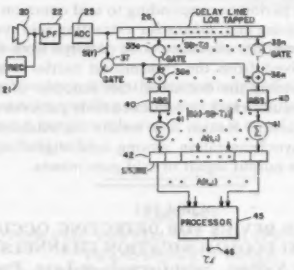
low level signal; means responsive to the second low level signal and the second gating signal for gating said second low level signal; means for amplifying said gated signals; means responsive to the amplified signal and said first gating signal for gating a first portion of said amplified signal to the high side of one of said speakers; and means responsive to the amplified signal and said second gating signal for gating a second portion of said amplified signal to the high side of the other of said speakers said means for gating the respective amplified signals including means for providing alternately a low impedance between the low side of one of the speakers and ground during one portion of a switching period and a high impedance between the low side of the other of the speakers and ground during the same portion of said switching period.

4,004,096

PROCESS FOR EXTRACTING PITCH INFORMATION

William R. Bauer, Glen Burnie, and William A. Blankinship, Annapolis, both of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 18, 1975, Ser. No. 550,904
Int. Cl.² Q10L 1/04
U.S. Cl. 179—1 SC **6 Claims**



1. A process for extracting pitch information from a digitized speech signal comprising the steps of:

selecting a plurality of values τ_i, each value representative of a frequency within the speech spectrum and logarithmically spaced within said spectrum;

segmenting the digitized signal into frames of predetermined length;

generating, for each frame and each value of pitch period τ_i, a score $W_t(i)$ representative of the cost of the cheapest sequence of pitch values ending with τ_i at time t;

generating for each frame an array $P_t(i)$ representative of the index of the immediately preceeding pitch period in said cheapest sequence, and

selecting for the current frame that τ_i for which $W_t(i)$ is minimum.

4,004,097

AUTOMATIC METER READING DEVICE

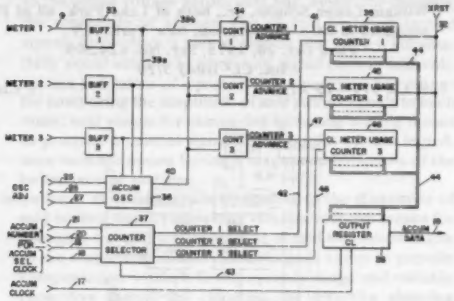
David M Spaulding, Marin County, Calif., assignor to Badger Meter, Inc., Richmond, Calif.

Filed Jan. 3, 1975, Ser. No. 538,355
Int. Cl.² H04M 11/00
U.S. Cl. 179—2 A **18 Claims**

1. An apparatus used for reading a number of meters and for transmitting meter data to a remote receiver, the improvement comprising:

means for repeating transmission of said data to said receiver, said repeating means being responsive to a condition of said receiver to terminate said transmission,

said repeating means comprising a modulo-n counter, n



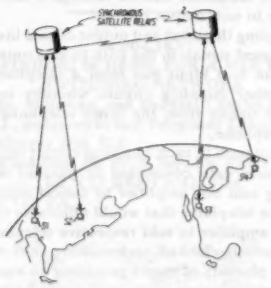
being an integer corresponding to the number of meters being read.

4,004,098

SATELLITE ON-BOARD SWITCHING SYSTEM WITH SATELLITE-TO-SATELLITE LINK

Nobuhiko Shimasaki, Tokyo, Japan, assignor to Communications Satellite Corporation (Comsat), Washington, D.C.

Continuation of Ser. No. 422,219, Dec. 6, 1973, abandoned. This application July 10, 1975, Ser. No. 594,881
Int. Cl.² H04J 3/06
U.S. Cl. 179—15 BS **8 Claims**



8. In a space division multiple access communications satellite system employing a first and second satellite each having an on-board switching matrix means under control of a precision oscillator and each satellite having separate spotbeam antennae in view of separate geographic zones and each satellite being communicatively link one to another and to a terrestrial reference station, a method of detecting a state of synchronization between said switching matrices comprising the steps of

a. transmitting to said first satellite from said reference station a burst of four unique words;

b. relaying the unique word burst from said first satellite to said second satellite, back to said first satellite and back to said reference station;

c. detecting at said reference a preselected pair of unique words in the unique word burst;

d. transmitting control signals to said oscillator upon failure to properly detect said preselected unique word pair; and

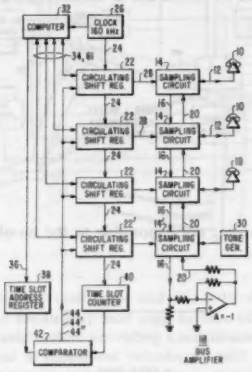
e. adjusting said oscillator in accordance with said control signals.

4,004,099

TIME DIVISION MULTIPLEX SWITCHING SYSTEM

Charlie Luther Jones, Jupiter; Gordon Lambert Hopkins, and William Lester Schulte, Jr., both of Lake Park, all of Fla., assignors to RCA Corporation, New York, N.Y.

Filed Oct. 20, 1975, Ser. No. 624,309
Int. Cl.² H04J 3/10
U.S. Cl. 179—15 AL 1 Claim



1. A time division multiplex private automatic branch exchange system for n telephones, comprising

a common interconnection input bus and output bus,

a bus amplifier connected from said output bus to said input bus,

n sampling circuits each including a unidirectional signal path loop from said input bus through a first transmission gate and an inverting amplifier to a connection with a respective telephone and on through a second transmission gate to said output bus,

means coupling the input and output of said inverting amplifier to cancel signals in the path to said output bus which arrived on said input bus from a telephone associated with another sampling circuit, whereby to prevent the return of signals from the other telephone back to the other telephone,

an additional path in each sampling circuit including a third transmission gate connected in parallel with the path including said bus amplifier to cancel signals from said respective telephone that would otherwise return through said bus amplifier to said respective telephone,

n simultaneously-clocked recirculating shift registers each having a plurality of stages providing an equal number of signal-sampling time slots, and each having an output coupled to the transmission gates in a respective sampling circuit, and

means to insert 1s in corresponding stages of at least two predetermined ones of said shift registers, said insert means including a flip-flop associated with each of said n shift registers, a computer connected to load 1s in predetermined ones of said flip-flops, gate means to transfer the contents of said flip-flops to input stages of said shift registers, a time slot address register connected to receive from said computer the number of said corresponding stages in the shift registers, a time slot counter operated from the same clocking means which advances the shift registers, and a comparator for comparing the number in the time slot address register with the number of the time slot counter and operative to enable said gate means when a coincidence occurs,

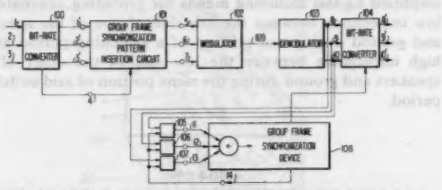
whereby to make a signal-sampling interconnection between the corresponding two telephones through said bus every time the 1s in the two recirculating shift registers simultaneously reach the outputs thereof and enable the respective transmission gates.

4,004,100

GROUP FRAME SYNCHRONIZATION SYSTEM

Yukio Takimoto, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Aug. 11, 1975, Ser. No. 603,903
Claims priority, application Japan, Aug. 14, 1974, 49-93000
Int. Cl.² H04J 3/06
U.S. Cl. 179—15 BS 6 Claims



1. A group frame synchronization system for establishing the frame synchronization in common to a plurality of time-division multiplexed digital signals of a common bit rate to be transmitted through a common carrier wave, comprising: means at the transmitting end for inserting identical but time-shifted group frame synchronization pseudo-random sequence code patterns respectively into said digital signals, said time-shifting being by an interval equal to an integral multiple of the clock pulse period corresponding to said common bit rate; and at the receiving end, means for extracting said synchronization pseudo-random sequence code patterns from said digital signals derived from the transmitted carrier wave, gate means for obtaining the exclusive -OR function of said synchronization pseudo-random sequence code patterns supplied from said extraction means, and means for establishing the group frame synchronization among said digital signals in response to the output signal of said gate means.

4,004,101

METHOD AND DEVICE FOR DETECTING OCCUPANCY OF TELECOMMUNICATION CHANNELS

Francois René Vaillant, Saint-Germain-en-Laye, France, assignor to Societe Anonyme de Telecommunications, France

Continuation-in-part of Ser. No. 385,244, Aug. 3, 1973, abandoned. This application Apr. 10, 1975, Ser. No. 566,816
Claims priority, application France, Jan. 12, 1973, 73.01049
Int. Cl.² G10L 1/00
U.S. Cl. 179—15 AS 11 Claims

1. A device for detecting occupancy of a telephone communication channel along which pass pulse code modulated telecommunication signals, said device comprising:

means for extracting cyclically, from samples of pulse-coded signals corresponding to discrete amplitudes of the transmitted signals passing along said channel and comprising several bits, the bit which defines the algebraic sign of each sample,

first means for comparing the bit corresponding to the sign of the samples present on the channel with a bit of known sign to determine the sign of the samples,

first means for counting the number n of successive samples bearing the same algebraic sign, whatever the amplitude and whichever the algebraic sign,

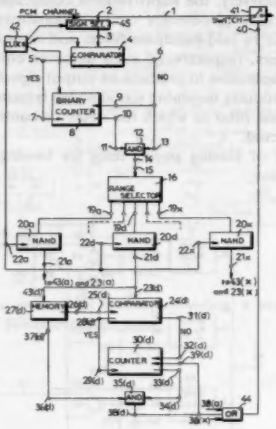
first means defining a plurality different ranges $]n_1, n_2[$ of successive integral values, said ranges possibly overlapping one another, the values n_1 and n_2 limiting said ranges not being included in the respective ranges,

second means defining for each of said ranges an empirical threshold value L which has been determined to represent speech signals,

second means for comparing the number n of successive samples bearing the same algebraic sign with said values n_1, n_2 defining each of said ranges to select at least one range of values comprising said number n,

second means for counting the consecutive times that the different ranges of values comprising the value *n* are selected,

third means for comparing the number of consecutive times that the different ranges are selected to the threshold



values L respectively associated with the selected ranges, and

means for controlling the transmission of signals along said channel according to whether said number of consecutive times a range is selected is at least equal to the respective threshold value L.

4,004,102

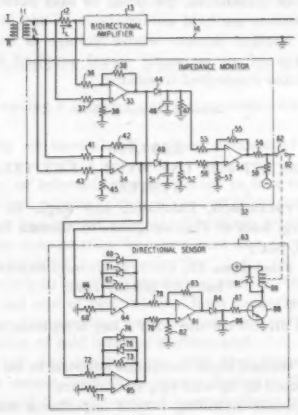
AUTOMATIC IMPEDANCE MODIFICATION OF TRANSMISSION LINES

Henry Walter Ott, Livingston, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 8, 1975, Ser. No. 602,988

Int. Cl.² H04B *3/40*

U.S. Cl. 179—16 F **7 Claims**



1. In apparatus for modifying the impedance characteristics of a transmission line while transmitting a signal, the combination of,

impedance monitor means in predetermined circuit relationship to said line comprising means for deriving a first signal proportional to the signal current flowing through said line, means for deriving a second signal proportional to the signal voltage across said line, means for changing the amplitude of at least one of said first and second signals to produce a pair of signals that have a substantially equal amplitude when said signal current and voltage are indicative of a prescribed impedance, and means for comparing the amplitude of said pair of signals to each other, said means for comparing including biasing means to produce a control signal at the output of said impedance monitor means having a magnitude indicative of the impedance of said line,

impedance matching means responsive to the magnitude of said control signal comprising variable resistive means for changing the effective resistance of said transmission line as the magnitude of said control signal varies to provide compensation within a first frequency range and variable capacitive means for changing the effective shunting capacitance across said line as the magnitude of said control signal varies to provide compensation within a second frequency range for said line, the second frequency range including a predominance of frequencies higher than the frequencies of the first frequency range and at least one frequency in common with a frequency of the first frequency range, the compensation serving to alter the impedance of said line over the bandwidth of the transmitted signal to correspond substantially to said predetermined impedance magnitude within a frequency range that falls within the frequency spectrum coextensive with said first and second frequency ranges, and

detecting means in circuit relationship with said line for ascertaining the direction of propagation of intelligence signals transmitted by said line, said detecting means including means for completing a conductive path for said control signal for application to said impedance matching means for a predetermined direction of propagation.

4,004,103

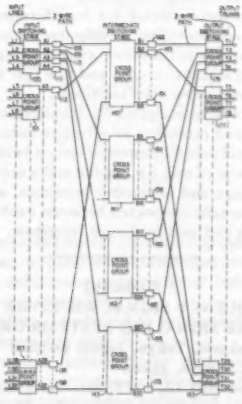
PATH-FINDING SCHEME FOR A MULTISTAGE SWITCHING NETWORK

Chao Kai Liu, Matawan, and Douglas Charles Smith, Locust, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 15, 1975, Ser. No. 622,516

Int. Cl.² H04Q *3/42*, *3/56*

U.S. Cl. 179—18 EA **10 Claims**



1. A switching network, including an input switching stage, at least one intermediate switching stage and an output switching stage, a plurality of interstage links connected between adjacent switching stages, means for indicating the busy and

idle state of each interstage link and means responsive to the indicating means for identifying idle paths between a particular incoming path terminating on the input stage and a particular outgoing path terminating on the output stage, characterized in that the switching network further includes

means for forming a pseudorandom pattern of binary bits consisting of a predetermined number of portions,

means responsive to the identifying means and to a first portion of the pseudorandom pattern for selecting a first idle path identified by the identifying means,

means responsive to the identifying means and to a second portion of the pseudorandom pattern for rejecting the first idle path identified and for selecting a second idle path identified by the identifying means and

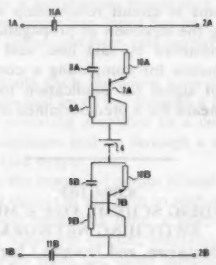
means responsive to the identifying means and to a third portion of the pseudorandom pattern for rejecting the first and second idle paths identified and for selecting a third idle path identified by the identifying means.

4,004,104

SYSTEM FOR FEEDING IN CONTINUOUS CURRENT TO A TELEPHONE LINE

Jean Picandet, Paris, and Francois Boullier, Saint-Ouen, both of France, assignors to Jeumont-Schneider, Puteaux, France

Filed Apr. 29, 1975, Ser. No. 572,724
Claims priority, application France, May 7, 1974, 74.15721
Int. Cl.² H04M *19/08*
U.S. Cl. 179—70 **8 Claims**



1. A d.c. power supply circuit for connection between telephone exchange terminals and telephone subscriber line terminals comprising:

a. a d.c. source having two poles,

b. a first transistor circuit for transforming a capacitive reactance and providing an effective inductive reactance therefor, said first transistor circuit being connected to one pole of said d.c. source and to a first juncture of said exchange and subscriber terminals,

c. a second transistor circuit for transforming a capacitive reactance and providing an effective inductive reactance therefor, said second transistor circuit being connected to the other pole of said d.c. source and a second juncture of said exchange and subscriber terminals, and

d. capacitor means connected between each of said transistor circuits and said exchange terminals.

4,004,105

MULTIFREQUENCY SIGNAL RECEIVER FOR USE IN TELEPHONE SIGNALING SYSTEMS OR THE LIKE

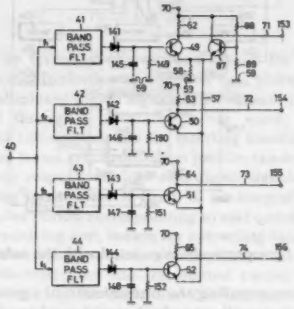
Shigeyuki Mizukoshi, Tokyo, Japan, assignor to Iwatsu Electric Co., Ltd., Tokyo, Japan

Filed May 13, 1975, Ser. No. 576,961
Claims priority, application Japan, May 15, 1974, 49-54057
Int. Cl.² H04M *1/50*
U.S. Cl. 179—84 VF **5 Claims**

1. A multifrequency signal receiver capable of separately detecting a plurality of incoming electrical signals of different frequencies transmitted through a common transmission medium, said receiver comprising input means connected to said transmission medium, a plurality of bandpass filters connected to said input means each permitting the passage therethrough of the incoming signal of a preselected frequency, and a plurality of detectors connected to said plurality of bandpass filters respectively, the improvement comprising:

a. a plurality of detector control transistors having bases coupled to said bandpass filters and associated with said detectors, respectively, each detector control transistor being operative to produce an output signal in response to the particular incoming signal which is passed through the bandpass filter to which the detector control transistor is connected;

b. a pair of biasing power lines for biasing said detector transistor;



c. a plurality of first resistors connected between one of said biasing power lines and the collectors of said detector control transistors, respectively;

d. a common line connecting emitters of said detector control transistors;

e. a second resistor connected between said common line and the other of said biasing power lines; and

f. a plurality of output circuits connected to the collectors of said detector control transistors, respectively, for delivery therethrough of the output signals from said detector control transistors,

whereby, during operation of any one of said detector control transistors, the other of said detector control transistors are held unresponsive to any incoming signals applied thereto whose voltage is less than the voltage of an incoming signal supplied to said one detector controlled transistor.

4,004,106

LINE CIRCUIT FOR USE WITH A KEY TELEPHONE SYSTEM

Gerald J. Yachabach, Lakeland, and Regis B. Mellon, St. Petersburg, both of Fla., assignors to Akzona Incorporated, Asheville, N.C.

Filed June 25, 1975, Ser. No. 590,004
Int. Cl.² H04M *1/00*
U.S. Cl. 179—99 **18 Claims**

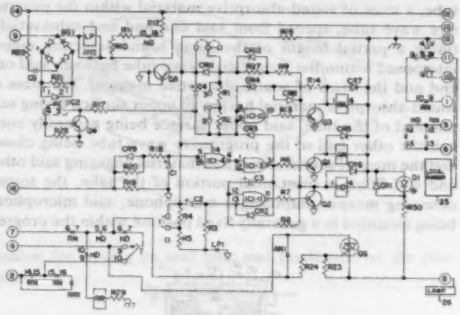
1. A line circuit for use with a key telephone system comprising:

first and second input terminals adapted to be respectively connected to tip and ring conductors;

a hold circuit including a hold impedance adapted to be connected across first and second input terminals during the hold condition, said hold circuit including a first switch means for activating said hold circuit;

a first output terminal adapted to be connected to a indicating means; the indicating means adapted to provide a first signal during said hold condition; timing means including

an analogue circuit for initiating the indicating means at a predetermined time after said hold circuit has been activated; the indicating means providing a second signal after said predetermined time.

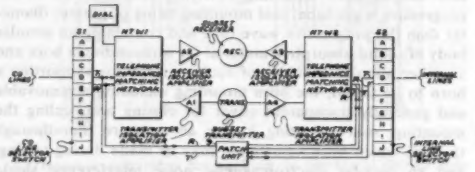


4,004,107

TELEPHONE CIRCUIT TO ELIMINATE USE OF A HOLD BUTTON

Richard E. Herlacher, Camp Hill, Pa., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Continuation-in-part of Ser. No. 549,240, Feb. 11, 1975, abandoned. This application Oct. 10, 1975, Ser. No. 622,287
Int. Cl.² H04M *1/72, 3/56*
U.S. Cl. 179—99 **19 Claims**



1. A telephone circuit to eliminate use of a hold button comprising:

a subset having a receiver and a transmitter for use by one party;

a plurality of central office lines connected to outside parties;

a plurality of internal lines connected to internal parties;

first means to couple said receiver and said transmitter to a selected one of said central office lines to enable a first two-way conversation between said one party and a selected one of said outside parties;

second means to couple said receiver and said transmitter to a selected one of said internal lines to enable to second two-way conversation between said one party and a selected one of said internal parties; and

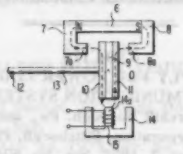
third means coupled between said first means and said second means, said third means having a first state to enable said first and second conversations to be carried on simultaneously and to prevent said selected one of said outside parties and said selected one of said internal parties from hearing each other and a second state to selectively enable said one party, said selected one of said outside parties and said selected one of said internal parties to be placed in a two-way conference.

4,004,108

ARMATURE FOR SOUND PICK-UP CARTRIDGE

Junichi Kurata, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed June 11, 1975, Ser. No. 585,893
Claims priority, application Japan, June 11, 1974, 49-65535
Int. Cl.² H04R *11/12*
U.S. Cl. 179—100.41 K **3 Claims**



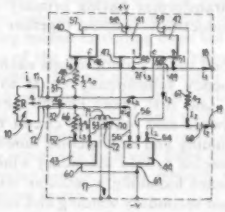
1. A pick-up cartridge comprising: an armature, pivotably mounted for rotation about an axis passing therethrough, a cantilever fixedly attached to said armature and having a sound needle at an end thereof, said armature composed of two pieces of high magnetic permeability material and a piece of high magnetic resistance material interposed between said two pieces of high magnetic permeable material at right angles to the axis of rotation, each piece of high magnetic permeability material constituting a separate magnetic path, a magnet fixedly positioned in an opposing relation to an end of the armature, and an E-shaped yoke having outer arms on respective sides of a central arm and being fixedly disposed in opposition to another end of the armature, generally centered with respect thereto, and having a detecting coil wound on said central arm, whereby; magnetic flux created by the magnet is first caused to pass through one of said two pieces of the high magnetic permeability material and on its return caused to pass through the other piece of said high magnetic permeability material.

4,004,109

HYBRID CIRCUIT

Frank S. Boxall, 380 Eleanor Drive, Woodside, Calif. 94062

Filed May 9, 1975, Ser. No. 575,927
Int. Cl.² H04B *1/58*
U.S. Cl. 179—170 NC **20 Claims**



1. A direct coupled hybrid circuit for providing signal conversion between a balanced bidirectional transmission path and a pair of unbalanced unidirectional transmission paths, said hybrid circuit comprising:

loop terminal means adapted to be coupled to said bidirectional transmission path;

first and second unidirectional terminal means each adapted to be coupled to a different one of said pair of unidirectional transmission paths; and

a plurality of current mirror circuit means coupled to said loop terminal means and said first and second terminal means said plurality of current mirror circuit means including current mirror circuits for coupling balanced

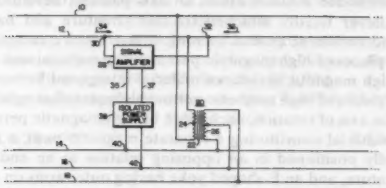
signals appearing on said loop terminal means to said second unidirectional terminal means and current mirror circuits for coupling incoming signals on said first unidirectional terminal means to said loop terminal means, said plurality of current mirror circuit means interconnected so that they suppress longitudinal mode signals appearing on said loop terminal means, and provide signal balance to suppress transmission of reflected echo signals from said first unidirectional terminal means to said second unidirectional terminal means.

4,004,110

POWER SUPPLY FOR POWER LINE CARRIER COMMUNICATION SYSTEMS

Ian A. Whyte, Churchill Borough, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 7, 1975, Ser. No. 620,444
Int. Cl.² H04B 3/44
U.S. Cl. 179—170 J **6 Claims**



1. A power line communication system for transmitting carrier signals over a distribution power line having high voltage primary and low voltage secondary conductors, said communication system comprising:

a signal amplifier means detecting and processing said carrier signals transmitted on said primary line conductor wherein said signal amplifier includes a power supply input; and

a power supply means for said signal amplifier means including:

an input means connected to said secondary line conductors,

an oscillator circuit means supplied by electric power applied to said input of said power supply means and operating at a frequency substantially higher than the frequency of the applied electric power,

an air core transformer having primary and secondary windings inductively coupled together through an air space,

first and second tuned circuit means each having a resonant frequency substantially equal to the oscillator frequency, said first tuned circuit means being connected between said oscillator circuit means and said primary winding and said second tuned circuit means being connected to said secondary winding, and

an output means including a rectifier means connected between said secondary winding and said power supply input of said signal amplifier means whereby said power supply means is effective to supply said signal amplifier means while being electrically isolated from the high voltage of the associated primary line conductor.

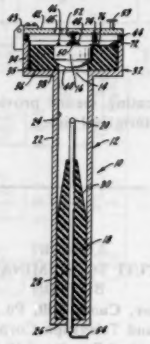
4,004,111

HORN TESTING DEVICE

Juris Turlais, Marion, Ind., assignor to United Filtration Corporation, Marion, Ind.

Filed Sept. 18, 1975, Ser. No. 614,497
Int. Cl.² H04R 29/00
U.S. Cl. 179—175.1 A **2 Claims**

1. A sound-detecting fixture for testing electric horns, comprising an elongated progressive wave tube, one end being adapted to receive sound from a horn being tested, means for seating a horn adjacent said one end of the progressive wave tube so that sound emitted from the horn is directed into the tube, a mass of sound-absorptive material within the progressive wave tube, spaced from said one end and substantially filling a partial length of the tube, sound-detecting means interposed within the progressive wave tube between said one end and the mass of sound-absorptive material, the mass of sound-absorptive material having an upper surface facing said one end of the tube, said upper surface being generally conical, the other end of the progressive wave tube being closed and the mass of sound-absorptive material engaging said other end and filling a substantial portion of the tube, the sound-detecting means comprising a microphone, said microphone being mounted in a generally fixed position within the progressive wave tube, the progressive wave tube comprising a generally cylindrical, elongated pipe having a hard reflective inner surface, said means for seating a horn comprising a generally bowl-shaped horn mounting overlying said one end of the progressive wave tube, said mounting being of greater diameter than the progressive wave tube and containing an annular body of sound-absorptive material for surrounding a horn and an inner annular shoulder of such material for supporting a horn to be tested, the horn mounting including a removable and generally transparent cover for closing and sealing the mounting, said mounting having an aperture therethrough through which horn adjustment may be made during testing, and an annular electromagnetic noise interference shield disposed between the horn mounting and annular body of sound-absorptive material for reducing electromagnetic interference during the testing of D.C. horns.



4,004,112

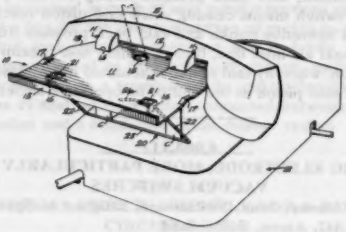
QUICKLY ATTACHABLE NOTE PAD SUPPORT ACCESSORY FOR DESK TELEPHONES

Irving Einstein, Miami Beach, Fla., assignor to Ruth Astor, Boulder, Colo. and Estelle Goldberg, Silver Springs, Md.

Filed Feb. 11, 1976, Ser. No. 657,213
Int. Cl.² H04M 1/21
U.S. Cl. 179—178 **8 Claims**

1. A desk telephone accessory comprising a flat platform sized to extend along the rear of a desk telephone base and have a front edge portion resting on the hand set cradle and to extend horizontally rearwardly to support a note pad thereon, said front edge portion being formed with a pair of spaced cutout openings for engaging the horns of the rear pair of cradle posts of said base, a pair of spaced ears extending from a bottom side and adjacent a rear edge of said platform, a wire bail-like brace pivotally attached at opposite ends thereof to said ears and extending forwardly and downwardly to engage

said telephone base, said brace and horn engagement in the cutout openings supporting said platform in said horizontal



position for writing on said note pad positioned on the platform.

4,004,113

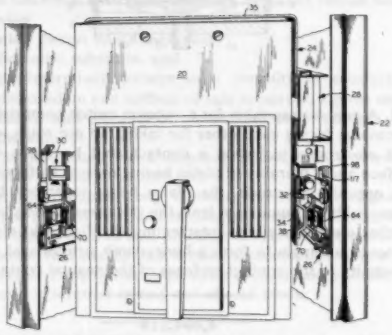
DRAWOUT APPARATUS FOR ELECTRICAL SWITCHBOARDS

Eric Axel Ericson, Plainville, and Frederick Daniel Kaufhold, Forestville, both of Conn., assignors to General Electric Company, New York, N.Y.

Filed Apr. 14, 1975, Ser. No. 567,618

Int. Cl.² H01H *9/20*

U.S. Cl. 200—50 AA **21 Claims**



1. Drawout apparatus for racking an electrical device into and out of a compartment in an electrical enclosure, wherein the electrical device and the enclosure are equipped with mating primary and secondary disconnect contacts, said drawout apparatus comprising, in combination:

A. a carriage mounting the electrical device, said carriage having opposed pairs of laterally extending mounting pins;

B. opposed rail assemblies mounted by the enclosure and supporting said carriage for movement of the device between an extended position where the primary and secondary contacts are disengaged and an engaged position where the primary and secondary contacts are engaged, each said rail assemblies including

1. an intermediate rail rollingly mounted to each compartment sidewall, and

2. an inner rail rollingly mounted to each intermediate rail, whereby said rails of each assembly move telescopically relative to each other,

3. said inner rails including upwardly opening notches receiving said carriage mounting pins;

C. locking means carried by each said intermediate rail and operable to open said notches for receipt of said carriage mounting pins when said intermediate and inner rails are fully extended and to securely lock at least one mounting pin of each pair in its respective notch during initial compacting movements of said rails;

D. means defining a test position for the device intermediate said extending and engaged positions where the primary contacts are disengaged and the secondary contacts are engaged, said carriage being manually movable on said rail assemblies between said extended and test positions;

E. means defining a disengaged position for the device intermediate said extended and test positions where the primary and secondary contacts are also disengaged; and

F. a racking mechanism mechanically assisting movement of said carriage between said test and engaged positions.

4,004,114

HORN SWITCH FOR MOTOR VEHICLES STEERING WHEELS

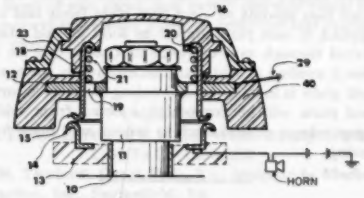
Franco Sportoletti Baduel, 20 Lungo Dora Bricca, Pianezza Torinese, Turin, Italy

Filed Apr. 24, 1975, Ser. No. 571,387

Claims priority, application Italy, May 9, 1974, 68455/74

Int. Cl.² H01H *9/00*

U.S. Cl. 200—61.56 **10 Claims**



1. A horn switch for a motor vehicle steering wheel for controlling a horn-operating circuit of the vehicle, said steering wheel having a frame including a hub and a rim rigidly interconnected by spokes, said frame having an upper side facing a driver of the vehicle and an underside, said horn switch comprising:

a horn-operating element;

means mounting said horn-operating element on the upper side of the steering wheel frame for rotation therewith and depression relative thereto;

means for upwardly biasing said horn-operating element;

a pair of opposed normally separated electrical contacts located on the underside of the steering wheel frame, one of said contacts being fixed and the other of said contacts being movable in rotation with the steering wheel frame and axially with said horn-operating element; and

connecting leg means extending from the upper side to the lower side of the steering wheel frame to connect said horn-operating element and said other movable contact;

said other movable contact being of annular form centered on the axis of the steering wheel such that depression of said horn-operating element causes said other movable contact to cooperate with said fixed contact to close the horn-operating circuit in any position of rotation of the steering wheel frame.

4,004,115

BUCKLES FOR VEHICLE SAFETY BELTS AND HARNESSES

Mark Edward Esner, London, England, assignor to Howard Wall Limited, London, England

Filed Sept. 19, 1975, Ser. No. 614,921

Claims priority, application United Kingdom, Nov. 13, 1974, 49043/74

Int. Cl.² H01H *3/16;* **A44B** *11/26*

U.S. Cl. 200—61.58 B **11 Claims**

11. A buckle for use with a safety belt or harness on a vehicle comprising:

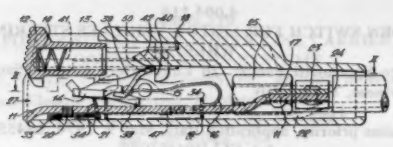
a casing having an entrance slot and a latching mechanism and connected to the vehicle;

a plate connected to a safety belt and being adapted to be locked to said casing by said latching mechanism;

switching means mounted in said casing for activating auxiliary equipment on the vehicle, said switching means being controlled by said plate;

latch releasing means on said casing for unlocking said plate from said casing; and

ejecting means in said casing for ejecting an unlocked plate from said casing, said ejecting means including a spring mounted on said casing to be engaged by said plate when



said plate is located in said casing, said spring being located closely adjacent said entrance slot so that an outward bias tending to eject said plate from said casing is applied to said plate almost as soon as said plate is inserted through said entrance slot such that an ejecting bias is applied to said plate for essentially the entire time said plate is located in said casing thereby ensuring that said plate will be completely ejected from said casing upon release of said latch to unlock said plate from said casing.

4,004,116

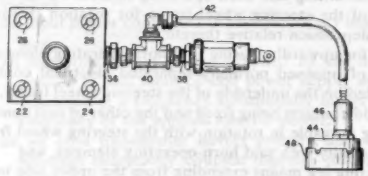
PNEUMATIC CYLINDER FOR CONTROLLING ELECTRICAL SWITCH OPERATION

Fernando Chiodini, Brooklyn, N.Y., assignor to Fenco Corporation, Newark, N.J.

Filed Apr. 9, 1975, Ser. No. 566,437

Int. Cl.² H01H *35/38*

U.S. Cl. 200—82 R **7 Claims**



1. A pneumatic switch control comprising a pneumatic cylinder including a hollow cylinder body having a piston slidably disposed therein and a piston rod extending from said piston to the outside of said cylinder body, first drive means for moving said piston in an operative stroke from one end portion of said cylinder body to the opposite end portion thereof, second drive means for moving said piston in a return stroke from said opposite end portion of the cylinder body to said one end portion thereof, said second drive means comprising an air inlet line communicating with said one end portion of said cylinder body for supplying air under pressure into said one end portion, said switch control also comprising a by-pass air line communicating with said air inlet line, and pressure actuated switch means connected to said by-pass air line, movement of said piston in said operative stroke by said first drive means creating back pressure in said opposite end of said cylinder body with said back pressure being applied through said air inlet line and said by-pass air line to said switch means for deactuating the latter, said pressure actuated switch means also being deactuated by pressure received from air introduced through said air inlet line to move said piston in its return stroke, movement of said piston in said operative stroke by said first drive means creating back pressure in said opposite end of said cylinder body with said back pressure being applied through said air inlet line and said by-pass air line to said switch means for maintaining the latter in deactuated condition, said back pressure acting on said pressure actuated switch means ceasing when said piston reaches the end of its operative stroke and said back pressure dissipates through said air inlet line, thus actuating said pressure actuated switch, whereby said switch is actuated in response to the arrival of said piston at the end of its operative stroke.

4,004,117

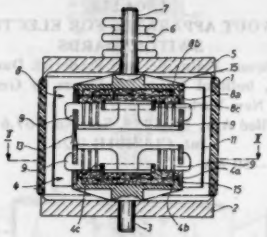
ARCING ELECTRODE, MORE PARTICULARLY FOR VACUUM SWITCHES

Joachim Amsler, Seon, Switzerland, assignor to Sprecher & Schuh AG, Aarau, Switzerland

Filed Sept. 18, 1974, Ser. No. 507,253

Int. Cl.² H01H *33/66*

U.S. Cl. 200—144 B **3 Claims**



1. A contact assembly for a vacuum switch comprising two electrodes facing each other for taking up arc roots, each of said electrodes including a contact stud having a contact surface and a plurality of plates having narrow surfaces facing the opposite electrode, the plates being separated by gaps whose width is equal to at least the thickness of the plate, and further electrode plates intersecting the first said electrode plates at an angle to form a honeycomb structure at least in proximity to the contact surfaces of the nearest contact stud.

4,004,118

METAL CLAD MONOPHASE SWITCHGEAR PANELS FOR HIGH VOLTAGES AND POLYPHASE SWITCHING PLANTS CONSISTING OF SUCH SWITCHGEAR PANELS

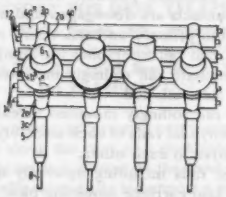
Rintje Boersma, Harmelen, and Gijsbert Waldemar Irik, Bilthoven, both of Netherlands, assignors to COQ B.V., Utrecht, Netherlands

Filed Mar. 18, 1975, Ser. No. 559,485

Claims priority, application Netherlands, Feb. 13, 1975, 7501717

Int. Cl.² H01H *33/82*

U.S. Cl. 200—148 B **10 Claims**



1. A metal clad polyphase electric distribution and switching plant comprising a plurality of polyphase assemblies which each consist of a number of monophase switch units, and at least one metal clad polyphase busbar system for the phase-wise interconnection of the switch units of said assembly, each

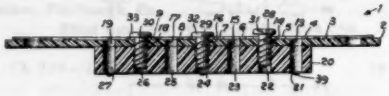
switch unit comprising a closed metal casing including a spherical section and at least two tubular sections attached to and extending radially with respect to said spherical section, a circuit-breaker accommodated in said spherical section, an isolator contained in each of said tubular sections of the casing, and a box for the accommodation of means to drive and to control said circuit-breaker and said isolators, said box being also attached to said spherical section, each isolator being connected to a terminal of the circuit-breaker and at least one of said isolators being connected between said circuit-breaker and a conductor of the busbar system.

4,004,119

ELECTRICAL SWITCH ASSEMBLY FOR A PRINTED CIRCUIT BOARD

Marc Rene Latour, Garner, N.C., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Aug. 20, 1975, Ser. No. 606,278
Int. Cl.² H01H *19/28*
U.S. Cl. 200—158 **9 Claims**



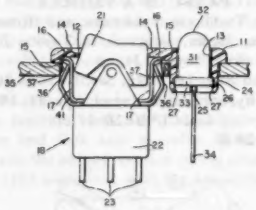
1. An electrical switch assembly for a printed circuit board comprising:
   - a printed circuit board including
     - a dielectric substrate, and
     - a predetermined pattern of a plurality of conductors disposed on one surface of said substrate, a given number of said plurality of conductors each having a gap therein;
   - a dielectric switch block disposed adjacent to a selected surface of said substrate; and
   - a plurality of completely metallic screws each disposed adjacent a different one of said gaps and extending into said block, each of said plurality of screws having a head thereon that makes and breaks a connection across an associated one of said gaps when each of said plurality of screws is screwed in and out of said block.

4,004,120

SWITCH BEZEL WITH VISUAL INDICATOR

Ivan A. Lee, E. Weymouth, Mass., assignor to C & K Components, Inc., Watertown, Mass.

Filed July 17, 1975, Ser. No. 596,598
Int. Cl.² H01H *9/00*
U.S. Cl. 200—310 **5 Claims**



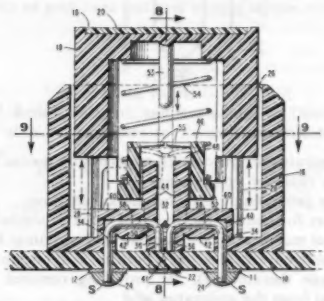
1. A switch assembly adapted to be mounted to a panel, said switch assembly comprising:
   - a generally rectangular bezel having a top surface, a bottom surface, at least one switch opening and at least one indicator hole therethrough spaced from said switch opening, said bezel including a pair of lateral undercut slots adjacent said bottom surface on opposite sides of said switch opening and a plurality of flexible fingers arcuate in transverse shape and projecting downwardly from said bezel, surrounding and rearwardly extending said indicator hole thereby forming a receptacle, said fingers having arcuate depressions on their inner surfaces separated from the distal ends thereof by inwardly beveled surfaces;
   - a switch having opposed outwardly projecting bracket members engaging said lateral slots whereby said switch is removably mounted to said bezel, said switch having an actuator element projecting upwardly through said switch opening; and
   - a generally cylindrical visual indicator device having a radially projecting annular flange formed at the bottom end thereof, said indicator device being mounted in said indicator hole with said flange seated within said arcuate depressions in said fingers, the top of said indicator projecting upwardly through said indicator hole;
   - said switch assembly being adapted to be mounted to said panel, said panel having openings therein configured to align with said switch opening and said indicator hole through said bezel, whereby said bezel is positioned on the front of said panel, said switch and said visual indicator project rearwardly through respective said openings in said panel.

4,004,121

ELECTRICAL SWITCH WITH WIRE BEAM SPRING CONTACT CLOSER

Robert H. Twyford, Great Falls, Va., assignor to Mechanical Enterprises, Inc., Springfield, Va.

Filed Apr. 4, 1974, Ser. No. 458,042
Int. Cl.² H01H *13/70*
U.S. Cl. 200—275 **9 Claims**



1. A switch comprising:
   - a housing having a cavity therein opening upwardly from said housing;
   - a pair of switch contacts supported against movement by said housing and extending inwardly of said cavity;
   - an elongated wire beam spring in said cavity supported adjacent its ends by said housing with a center portion free to be flexed, said center portion passing above said contacts and having a normal position spaced from said contacts whereat the electric circuit between said contacts is open;
   - an actuator mounted in said cavity to flex said center portion of said wire beam spring from said normal position to engage said contacts upon depression of said actuator, said actuator including a plunger reciprocably mounted in the open end of said cavity with an actuator spring beneath said plunger to be compressed by said plunger and flex said center portion of said beam spring;
   - a spring rider interposed between said wire beam spring and said actuator spring, said rider having spaced legs engaging said wire beam spring at points along the beam spring

to flex said beam spring into circuit closing engagement with said contacts;

said plunger carrying column means extending toward said spring rider and spring finger means being provided on said spring rider, said column means engaging said spring finger means at a predetermined point in travel of said plunger to apply force through said finger means to said spring rider in effecting switch actuation.

4,004,122

MULTI-ZONE MICROWAVE HEATING APPARATUS

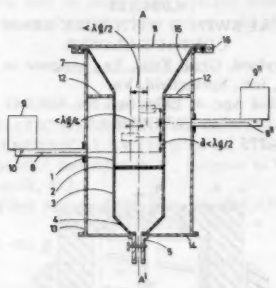
Bernard L. D. Hallier, St. Maur, La Varenne, France, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Sept. 18, 1974, Ser. No. 507,097

Claims priority, application France, Nov. 6, 1973, 73.39317; Dec. 7, 1973, 73.43703

Int. Cl.² H05B 9/06

U.S. Cl. 219—10.55 A **10 Claims**



1. An apparatus for processing materials by means of electromagnetic radiation comprising:

means for generating electromagnetic radiation;

a container for holding the material to be processed;

an external metal casing for housing said container having a removable cover, sides and a bottom, said bottom having a passage therethrough for providing removal of said material from the apparatus; and

an internal metal rim extending from the interior surface of the sides of said casing for at least partially limiting electromagnetic radiation to said container for the portion thereof between the top of said rim and the underside of said cover; and

a plurality of openings through said casing below said rim;

means for generating electromagnetic radiation comprising:

a plurality of microwave generators having waveguides associated therewith communicating to the interior of said container below said rim through said openings;

said container having a porous partition located therein to define a first zone thereabove within said container for processing said materials in a solid form and a second zone therebelow for processing materials in a liquid form; and

said container having a loading passage portion above said rim at least partially protected from said electromagnetic radiation, a solid form processing portion between said rim and said porous partition, a liquid processing portion located intermediate said partition and the bottom of said container and a removing passage portion communicating with the passage through the bottom of said casing.

4,004,123

METHOD OF AND SYSTEM FOR THE CONTROLLING OF AN APPARATUS FOR THE ELECTRIC DISCHARGE MACHINING OF A WORKPIECE

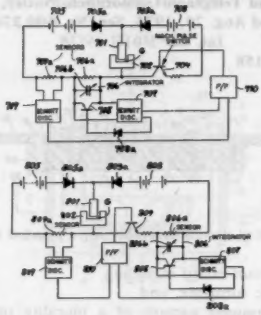
Kiyoshi Inoue, 3-16-8 Kamiyoga, Setagaya, Tokyo, Japan

Division of Ser. No. 408,382, Oct. 23, 1973, Pat. No. 3,864,541, which is a continuation-in-part of Ser. No. 272,463, July 17, 1972, Pat. No. 3,781,507, which is a division of Ser. No. 19,364, March 13, 1970, Pat. No. 3,686,461. This application Aug. 1, 1974, Ser. No. 493,772

Claims priority, application Japan, Feb. 20, 1973, 48-20341; Feb. 21, 1973, 48-21015; Mar. 3, 1973, 48-25832; May 17, 1973, 48-55019; July 26, 1973, 48-83586; July 12, 1973, 48-102208

Int. Cl.² B23P 1/08

U.S. Cl. 219—69 C **8 Claims**



1. A method of controlling the machining of a workpiece by the application of machining pulses across a dielectric-swept gap between said workpiece and an electrode spacedly juxtaposed therewith, the method comprising the steps of:

switching a machining current power supply on and off in circuit with said gap to apply machining discharges thereacross;

integrating a signal representing the gap current passing through said gap after initiation of a discharge thereacross to produce a control signal; and

effecting the switching of said power supply upon the magnitude of said signal attaining predetermined value, said control signal being produced by converting a signal representing the gap current into a train of digital pulses and integrating said train of digital pulses.

4,004,124

METHOD OF FORMING A SEAM IN A BODY OUTER PANEL OF A VEHICLE

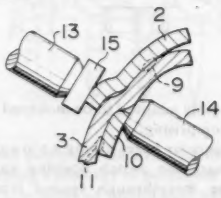
Yoneji Nakane; Toshikazu Nakamura, and Hiromichi Magota, all of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Aug. 13, 1975, Ser. No. 604,208

Claims priority, application Japan, Apr. 11, 1975, 50-44062

Int. Cl.² B62D 27/00

U.S. Cl. 296—28 R **13 Claims**



1. A method of forming a seam in a body outer panel of a

vehicle like an automobile, comprising the steps of displacing end portions of first and second panel plates toward the outside and inside of the panel, respectively, each of said panel plates being displaced by an amount substantially equal in thickness of a panel plate adjacent a seam to be formed, laying one of said panel plates over the other in a manner such that the outside surface of a basic portion of said first panel plate contacts the displaced end portion of said second panel plate and the inside surface of a basic portion of said second panel plate contacts the displaced end portion of said first panel plate, applying a plate piece to an inside surface portion of said first panel plate located adjacent its displaced end portion, said plate piece having substantially the same thickness as said first panel plate, connecting the overlapped portions of said two panel plates together by spot-welding under the compression and substantially removing the displaced end portion of said second panel plate.

4,004,125

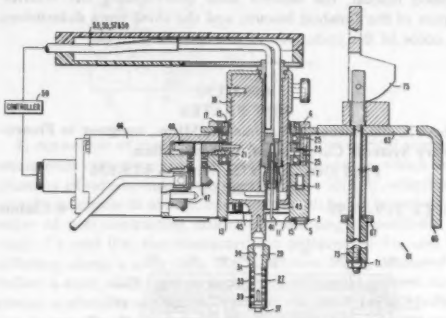
MULTIHEAD WELDING GUN

Ben B. Hood, Valrico, and Raymond H. Glatthorn, St. Petersburg, both of Fla., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 14, 1975, Ser. No. 604,750

Int. Cl.² B23V *9/12*

U.S. Cl. 219—125 R **10 Claims**



1. A multihead welding gun for welding tubes to a tube sheet, said multihead welding gun comprising a plurality of non-consumable electrodes, means for blanketing the area around said electrodes with a suitable gas, a plurality of housings, a plurality of rotor members, each rotor member having one of said electrodes eccentrically disposed therein, each of said rotor members being rotatably mounted and having means disposed thereon for axially aligning said rotor members with a tube, means for rotating said rotor members whereby said electrodes generally circumscribe the adjacent tube-tube sheet junctures, at least one of said housings being movable so that the axis of rotation of the associated rotor member is movable, a faceplate cooperatively associated with said housings and a backup plate generally parallel to said faceplate, means insertable in a tube which cooperates with said plates to position each electrode adjacent a tube-tube sheet juncture and lock said movable housings in a fixed position whereby the axis of rotation of the rotor members are essentially in axial alignment with the associated tube.

4,004,126

WINDSHIELD HEATING DEVICE

Premakaran T. Boaz, Southgate, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 15, 1975, Ser. No. 641,005

Int. Cl.² H05B *1/00*; E06B *7/12*; B60S *1/54*

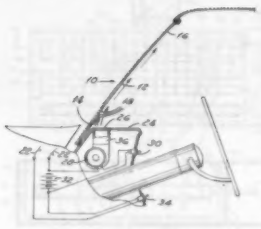
U.S. Cl. 219—203 **2 Claims**

1. A windshield heating device for a motor vehicle which comprises:

a windshield having an upper portion normally within the driver's field of vision and a lower portion normally not within the driver's field of vision;

a plurality of grid lines deposited on only said lower portion of said windshield; said lines being bonded to said windshield and being formed of a material capable of heating up when an electric current is passed therethrough;

an instrument panel in the motor vehicle adjacent said lower portion of said windshield, said instrument panel having an opening therein in juxtaposition with said grid lines on said windshield;



a blower motor including a blower device mounted in the motor vehicle;

duct means passing at least in part through said instrument panel for providing a passageway interconnecting said blower device of said blower motor with said opening of said instrument panel so that air moving through said duct means passes out through said opening of said instrument panel and over said plurality of grid lines; and

electric circuit means for supplying power to said plurality of grid lines and said blower motor.

4,004,127

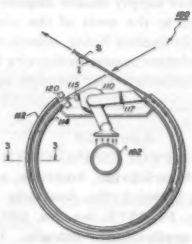
ON LINE FUSING SYSTEM

John M. Bailey, Fairport, and Raghulinga R. Thettu, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Mar. 2, 1976, Ser. No. 663,025

Int. Cl.² H05B *1/00*; G03G *15/20*

U.S. Cl. 219—216 **6 Claims**



1. An on line fusing system for fusing toner images onto sheets produced by a copier/duplicator machine comprising:

a pair of closely spaced plate members defining a sheet path along which sheets bearing loose toner images are advanced,

at least one of said plate members being made of material which is transparent to radiation,

a flash lamp positioned to direct radiation towards said transparent plate member and sheet path at a predetermined time, and

blower means for directing warm air under pressure at the

inlet end of said plate members to transport the sheets along their path and crust the loose toner images on said sheets prior to said images receiving radiation from said flash lamps.

4,004,128

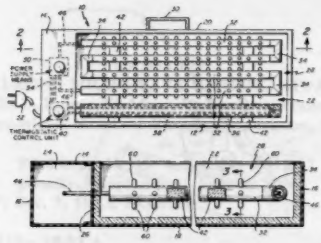
PORTABLE ELECTRIC RADIANT HEATER

Carlo Marchesi, 31 Winter St., Saugus, Mass. 01906

Filed Apr. 18, 1975, Ser. No. 569,485

Int. Cl.[2] H05B *1/02, 3/44;* **F24H** *9/18;* **F28F** *1/20*

U.S. Cl. 219—346 **11 Claims**



1. A heater comprising;

a housing having means defining a heating area in the housing and a control area in the housing, said heating area of the housing having an open front,

a hollow pipe system disposed in the heating area of the housing and arranged to radiate heat through said open front, said pipe system comprising a plurality of pipe segments each constructed of a fired clay material that rapidly absorbs heat and radiates the heat over a long time period and a plurality of protruberances radially extending from each pipe segment, means coupling said hollow pipe segments together to form a continuous internal passage,

an electrical resistance heating conductor means extending through the continuous passage in the pipe system in spaced relation to the inner surface thereof and with the ends of the conductor means extending into the control area of the housing,

said conductor means being disposed in each pipe segments with essentially only an air space between the inner surface of the pipe segments and conductor means,

and an electric power supply means disposed in the control area and coupled to the ends of the conductor means, said power supply means being selectively operated to energize the conductor means to thereby heat said hollow pipe system for radiating heat through said open front.

4,004,129

FOOD PROCESSING OVEN

Kevin Joseph Hicks, Marrickville, Australia, assignor to Auto-Bake Pty. Limited, Marrickville, Australia

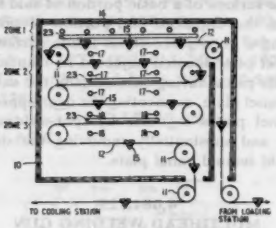
Filed Aug. 19, 1975, Ser. No. 605,958

Claims priority, application Australia, Dec. 27, 1974, 8666/74

Int. Cl.[2] F27B *9/06*

U.S. Cl. 219—388 **8 Claims**

1. A baffleless commercial biscuit baking oven comprising a casing, thermal insulation on said casing, two bottom openings to said casing, an endless spaced apart link-chain type conveyor passing through said openings and having a baking first section inside said casing and a loading and unloading section outside said casing, closely spaced baking trays on said conveyor, horizontally extending runs of said conveyor in said first section, electrical radiant heating elements disposed in three vertically spaced zones in said casing, first controls outside said casing determining the setting of the heating elements in the first zone, second controls outside said casing determining the setting of the heating elements in the second zone, third controls outside the casing determining the setting of the heating elements in the third zone, temperature stabilizing means including a temperature sensor inside the second zone and a switch controlling the current supply to the heater elements of the second zone in response to said temperature



sensor, and means for maintaining the trays horizontal during their passage through the oven; whereby, when the oven is in use, each tray is transported downwards through the oven and a different stage of baking is performed in each of the three zones, the first zone determining the size and top color of the finished biscuit, the second zone determining the interior texture of the finished biscuit, and the third zone determines the color of the underside of the biscuit.

4,004,130

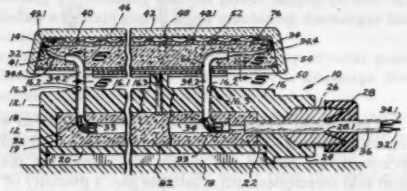
HOT PLATES

Robert S. Blackwood, Chanhassen, Minn., assignor to Fluoroware Systems Corporation, Chaska, Minn.

Filed Oct. 23, 1975, Ser. No. 625,136

Int. Cl.[2] H05B *3/68*

U.S. Cl. 219—459 **6 Claims**



1. A hot plate to resist hostile environments including highly corrosive chemicals, comprising:

a base through which power wires extend;

a horizontal heater plate overlying the base in spaced and confronting relation and including a ceramic panel to carry and transmit heat to the heating load thereon, the ceramic panel having downturned sides and edges spaced below the top face of the panel and defining a heater cavity, the heater plate having lead wires extending from the base to the heater plate and spanning the space therebetween, a bottom panel on the heater plate adjacent the downturned edges of the ceramic panel and having an opening through which said lead wires extend,

the heater plate including a foamed epoxy filler in the heating cavity and sealed entirely around the periphery of the ceramic panel to the downturned sides thereof to exclude such corrosive chemicals from the heater cavity, the filler also providing efficient heat insulation against heat loss from the plate;

a high temperature resisting and insulating pad in and extending entirely across the heater cavity between the downturned panel sides and lying between the filler and the ceramic panel; and

an electric resistance heating element in the heater cavity

and disposed between the pad and the ceramic panel, the heating element being pressed against and in intimate engagement with the ceramic panel and retained against the panel by pressure exerted from the filler and through the high temperature resisting pad to thereby efficiently transfer heat from the heating element to and through the ceramic panel to the heating load carried thereon.

4,004,131

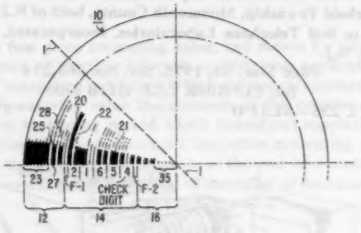
ARTICLE CARRYING CODED INDICIA

John Tettemer Oneil, Jr., Princeton; Angelo Pelios, Somerville; Allen Henry Simon, Hightstown, all of N.J., and Frank George Nickl, Northboro, Mass., assignors to RCA Corporation, New York, N.Y.

Division of Ser. No. 345,322, March 27, 1973. This application Oct. 24, 1974, Ser. No. 517,761

Int. Cl.² G06K *19/06*

U.S. Cl. 235—61.12 N **1 Claim**



1. An article of manufacture to be read by optical scanning equipment comprising an information medium on which are a plurality of side-by-side indicators of unit width, U, which may vary from article to article, each unit width being in one or the other of two contrasting colors representing respectively binary 1's and 0's, the characteristic patterns of 1's and 0's differing along a scan line, the indicators being arranged to define a start, data, and stop portion, said start portion comprising a plurality of alternating color single unit width indicators to provide coded information corresponding to the scanning rate thereof, said data indicators being arranged so that no more than four side-by-side adjacent indicators have the same characteristics.

4,004,132

CONVERTIBLE FLASHLIGHT-LANTERN

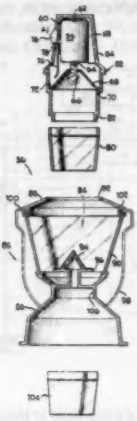
Marvin I. Glass, Chicago, and Palmer J. Schoenfield, Evanston, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Division of Ser. No. 333,745, Feb. 20, 1973. This application Oct. 21, 1974, Ser. No. 516,582

Int. Cl.² F21L *1/00, 15/08, 27/00*

U.S. Cl. 240—10.63 **3 Claims**

1. A convertible flashlight lantern, comprising, in combination: a flashlight-type lighting construction unit including a self-contained, power source, a lamp, a reflector mounted on one end of said unit generally about said lamp for directing a beam of light therefrom in a generally singular direction, and switch means for connecting said lamp to said power source for illuminating the lamp, a lantern type conversion unit comprising an upwardly tapering lantern base portion and upwardly diverging light transmitting lantern shield mounted on said base portion, an upper lantern cap mounted on said shield, said cap including a generally cylindrical aperture therein to provide access to the interior of said shield, connecting means mounted on said cap for removably connecting and holding the flashlight unit with its beam of light directed generally toward the center of the base portion, diffusion means mounted on said base portion in the path of said beam of light from the flashlight unit when the flashlight unit is connected to said cap by said connecting means for reflecting the light outwardly from the conversion unit in plural directions through said shield, and at least one removable, generally tubular, at least translucent lens member mounted on said one end of the flashlight unit for surrounding said diffusion



means when the flashlight unit is connected by said connection means to said lantern cap and including a loop-type handle pivotally mounted to said lantern cap and protruding upwardly beyond the top of said flashlight when connected by said connection means.

4,004,133

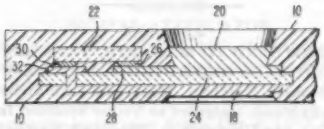
CREDIT CARD CONTAINING ELECTRONIC CIRCUIT

William James Hannan, Palm Beach Gardens; Edwin Maxwell Fulcher, Lake Park; Randy Deleon Rhodes, Palm Beach Gardens, and Robert George Saenz, Palm Beach, all of Fla., assignors to RCA Corporation, New York, N.Y.

Filed Dec. 30, 1974, Ser. No. 537,439

Int. Cl.² G06K *7/06, 19/06;* G11C *11/44*

U.S. Cl. 235—61.7 B **13 Claims**



12. A system useful for personal identification and credit purposes, comprising

an article adapted to be carried by an individual and comprising an insulating substrate containing two surface terminals connected to an imbedded electronic serial memory storing an identifying binary value,

said electronic serial memory including an address counter responsive to a clock pulse wave, a decoder responsive to the address counter, and transistor bit-storage circuits connected to said terminals and responsive sequentially to the output of the decoder, and

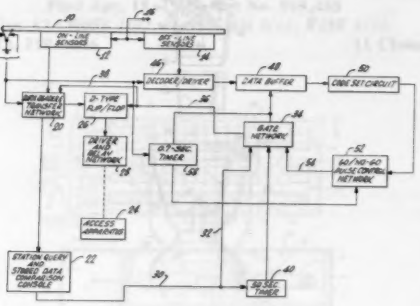
means to read out the binary value from the serial memory comprising means to supply an electric current through said surface terminals to energize said memory, and means to detect said stored information as changes in said electric current.

4,004,134

OFF-LINE MAGNETIC CARD READER SYSTEM OPERABLE AS THOUGH NORMALLY ON LINE

Rong H. Hwang, Arcadia, Calif., assignor to Rusco Industries, Inc., Los Angeles, Calif.

Filed June 17, 1975, Ser. No. 587,633
Int. Cl.² G06K *5/00, 7/08*
U.S. Cl. 235—61.7 R **5 Claims**



1. In combination:

means for receiving a card that is magnetized in a plurality of spots,

one predetermined spot pattern representing one set of data and a second predetermined spot pattern representing a second set of data;

an electrically operable device;

control means for said device;

logic circuit means coupled to said control means and adapted to be set to condition said control means for operating said device;

first means for detecting said first set of data from the card;

means responsive to the data detected by said first means to set said logic circuit means so as to condition said control means for operating said device;

means to detect inoperativeness of said setting means;

second means for detecting said second set of data from the card;

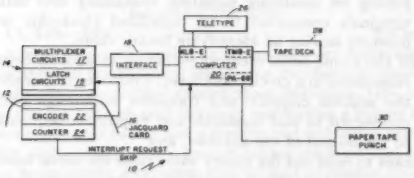
and means coupled to said inoperativeness detecting means and to said second means and responsive to the second set of data to set said logic circuit means so as to condition said control means for operating said device, upon detection of inoperativeness of said first-mentioned setting means.

4,004,135

JACQUARD CARD TO MAGNETIC TAPE ARCHIVES STORAGE AND RETRIEVAL SYSTEM

Gottfried Maurer, Needham, Mass., and Emil Meier, Wadenswil, Switzerland, assignors to Viable Systems, Inc., Needham, Mass. and Gessner A.G., Wadenwil, Switzerland, part interest to each

Filed Oct. 23, 1974, Ser. No. 517,243
Int. Cl.² G06K *1/02;* **D03C** *1/00;* **D03J** *1/10*
U.S. Cl. 235—61.1 **14 Claims**



11. A method for the storage of weave information on a Jacquard card which includes:

a. effective relative movement between a Jacquard card having a hole/no hole weave pattern therein and a sensing head;

b. reading and converting on a hole/no hole basis to machine data at least a portion of the weave pattern on the Jacquard card;

c. rereading the weave information of the Jacquard card;

d. comparing the reread information with the information originally read;

e. identifying any errors between said compared information;

f. storing said compared information; and

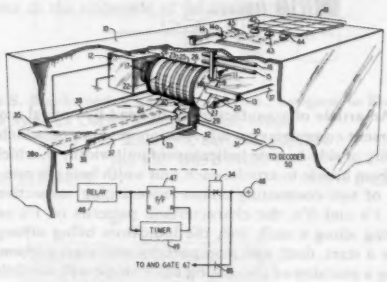
g. controlling the movement of the card and the reading and converting, and storing of the information in timed sequence.

4,004,136

CREDIT VERIFICATION TERMINAL WITH DUAL INFORMATION SOURCES

Gabor Peter Torok, Lincroft, and John William Wesner, Jr., Freehold Township, Monmouth County, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 24, 1975, Ser. No. 561,274
Int. Cl.² G06K *7/08;* **G11B** *5/00*
U.S. Cl. 235—61.11 D **17 Claims**



1. A credit verification terminal for providing, sequentially, information identifying a user of said terminal by a user code contained on a record medium and information identifying said terminal by a merchant code stored in said terminal, comprising:

a head for reading said merchant and user codes when moved past said head, and

dual purpose means for a) storing said merchant code in an area thereof and adapted to move said area containing said code past said head, whereby said merchant code is read, and b) moving said record medium between said head and said area, whereby said user code is read and reading of said merchant code is precluded.

4,004,137

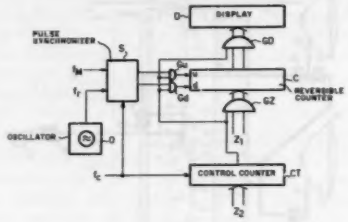
READOUT APPARATUS FOR FREQUENCY OR PERIOD-ANALOG MEASURING SIGNALS

Gerd Schroder, Hamburg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 31, 1974, Ser. No. 537,690
Claims priority, application Germany, Jan. 4, 1974, 2400285
Int. Cl.² G06M *3/00*
U.S. Cl. 235—92 TF **13 Claims**

1. An apparatus for the digital readout of a physical measuring quantity represented by the frequency of a measuring pulse train comprising, a reversible counter having up and down counting input terminals, means coupled to the counter to preset it to a first count which represents a first given mea-

suring value, means for applying a measuring pulse train whose frequency is proportional to said physical measuring quantity to the counting input terminal for one counting direction during a first time interval of adjustable length, means for applying a reference pulse train to the opposite counting input terminal of the counter during a second, equally long time interval, means for equalizing the frequency of the reference pulse train to that of the measuring pulse train which represents the first given measuring value, and means for adjusting the duration of the time intervals so that upon application of a second measuring pulse train which represents another given physical measuring value the contents of the counter at the end of the measuring period which terminates together with the last time interval represents the other measuring value, whereby the count in said counter at the end of a measuring period provides a direct readout of the value of the measuring quantity.



4,004,138

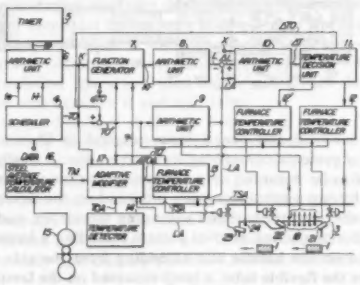
METHOD OF AND SYSTEM FOR CONTROLLING TEMPERATURE OF CONTINUOUS FURNACE

Yasuo Morooka; Mikihiko Onari, and Hidehiro Kitanosono, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Continuation-in-part of Ser. No. 253,837, May 16, 1972, abandoned. This application May 13, 1974, Ser. No. 469,676

Int. Cl.² F27B 9/40

U.S. Cl. 235—151.1 **10 Claims**



1. A method of controlling the temperature of a continuous furnace equipped with a preheating zone temperature controlling burner, a heating zone temperature controlling burner, and a soaking zone temperature controlling burner, including controlling the preheating zone temperature controlling burner or the heating zone temperature controlling burner to keep the distance from the entry port of the furnace to a position in the preheating or heating zone where the furnace temperature is substantially equal to a desired delivery temperature of a body to be heated at a predetermined value which is determined in accordance with at least one of the shape, size and dwell time of the body.

4,004,139

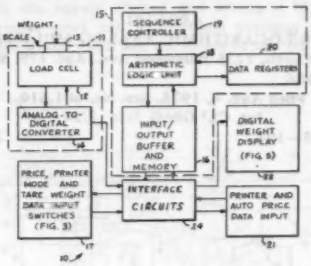
DIGITAL SCALE WITH MEANS TO SHIFT DISPLAYED WEIGHT TO SHOW FRACTION OF LEAST NORMALLY DISPLAYED GRADUATION

Donivan L. Hall, Toledo, Ohio, assignor to Reliance Electric Company, Pepper Pike, Ohio

Continuation-in-part of Ser. No. 434,431, Jan. 18, 1974, abandoned. This application Apr. 30, 1975, Ser. No. 573,162

Int. Cl.² G01G 19/413

U.S. Cl. 235—151.33 **8 Claims**



5. Measuring apparatus comprising, in combination, scale means for generating a digital weight signal having a first predetermined number of digits corresponding to the weight of an article, said scale means including means for manually adjusting the digital weight signal to zero, digital weight indicator means for displaying a second predetermined number of weight digits less than the first predetermined number of weight digits, said digital weight indicator means normally displaying the second predetermined number of the most significant digits of the weight signal, means for causing said digital weight indicator means to display the second predetermined number of the least significant digits of the weight signal while said scale means is adjusted to zero whereby the zero accuracy of the scale means is displayed for accurate adjustment while zero weight is on said scale means, means for computing an article value from the second predetermined number of the most significant digits of the weight signal and a preselected price per unit weight, and means for printing an article label including the second predetermined number of the most significant digits of the weight signal and the computed value.

4,004,140

DIGITAL ATTENUATOR

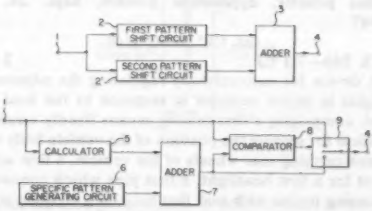
Kazuto Izumi, and Kazuo Izumi, both of Yokohama, Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Filed Sept. 20, 1974, Ser. No. 507,812

Claims priority, application Japan, Oct. 8, 1973, 48-113109

Int. Cl.² G06F 7/39

U.S. Cl. 235—152 **3 Claims**



1. A digital attenuator comprising input terminal means for receiving an input PCM signal, a pattern shift circuit con-

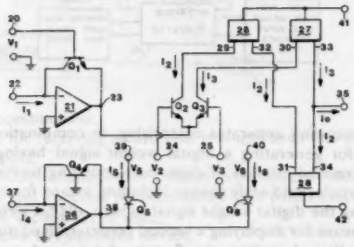
nected to said input terminal means for shifting signals applied thereto to the lower digit side, a specific pattern generating circuit for generating an integer pattern, an adder connected to add said integer pattern to the output of said pattern shift circuit, a comparator connected to compare the output signal of said adder with signals applied to said input terminal means, an output terminal, and a switching circuit responsive to said comparator and connected to apply the lower of the signals at said input terminal means and at the output of said adder to said output terminal.

4,004,141

LINEAR/LOGARITHMIC ANALOG MULTIPLIER

Douglas R. Curtis, 1235 Wildwood Ave., Apt. 179, Sunnyvale, Calif. 94086

Filed Aug. 4, 1975, Ser. No. 601,610
Int. Cl.² G06G 7/16, 7/24
U.S. Cl. 235—194 **28 Claims**



1. A device for generating an output signal which is proportional to the product of two input voltages, said device comprising:

first and second semiconductor elements each having a diode junction with operating characteristics such that a current passed through said junction is substantially an exponential function of a voltage across said junction;

means for algebraically summing said two input voltages and applying said sum across the diode junction of one of said semiconductor elements,

means for applying one of said voltages across the diode junction of the other of said semiconductor elements; and

differencing means for generating a signal proportional to the difference between the currents passed through the junctions of said first and second elements, whereby said generated signal is proportional to the product of said two input voltages.

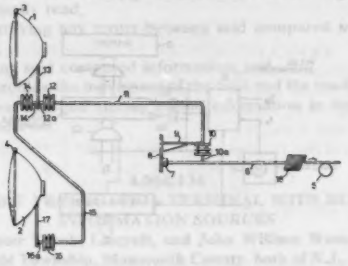
4,004,142

DEVICE FOR REGULATING THE ADJUSTMENT OF VEHICLE HEADLIGHTS

Nils Owe Pärsson, Trollhattan, Sweden, assignor to Saab-Scania Aktiebolag, Sodertalje, Sweden

Filed Sept. 23, 1974, Ser. No. 508,717
Claims priority, application Sweden, Sept. 24, 1973, 7312947
Int. Cl.² B60Q 1/10
U.S. Cl. 240—7.1 LJ **2 Claims**

1. A device for automatically regulating the adjustment of headlights in motor vehicles in response to the load on the vehicle, comprising a first sensing means fixedly arranged on the vehicle for sensing the position of the vehicle body relative to means carrying rear wheels of the vehicle, a first actuating element for a first headlight, a first pipe which connects said first sensing means with said first actuating element so that a first closed system is formed, a second sensing means arranged to sense the movements initiated by the first actuating element, a second actuating element for a second headlight, and a second pipe which connects said second sensing element with said second actuating element so that a second closed system is formed, the said first and second closed systems being filled with a liquid for transmitting movement between respective sensing means and actuating elements for the regulation of the adjustment of the first and the second headlights respectively, said adjustments being regulated by pivotal movements of the headlights about fixed shafts, the first sensing means engages with an arm having one end pivotally connected to the vehicle body, and its other end arranged to move together with the rear axle of the vehicle, a portion of the arm is a closely wound helical spring with its central axis extending in the longitudinal direction of the arm, thereby making said arm flexible so as to prevent rear axle springing movements being transferred into movements regulating the adjustment of the headlights when the vehicle is driven.

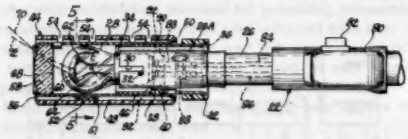


4,004,143

MEDICAL AND DENTAL LAMP

Palmer W. Good, Oak Brook; John P. Good, River Forest, and Paul R. Hinz, Berkeley, all of Ill., assignors to Good-Lite Company, Forest Park, Ill.

Filed June 27, 1975, Ser. No. 590,867
Int. Cl.² A61B 1/06
U.S. Cl. 240—44.15 **6 Claims**



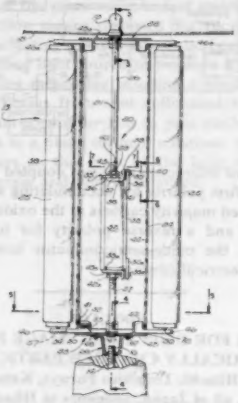
1. A medical and dental lamp adapted to illuminate the mouth of patients comprising in combination; a flexible tube adapted to be mounted on a supporting means at one end, a handle having a tubular portion mounted on the flexible tube at the other end thereof and extending therefrom, and a light source for projecting an oval pattern including a lamp holder mounted on the handle and extending from the side thereof opposite the flexible tube, a lamp mounted on the lamp holder having an elongated thin filament, a hollow elongated sleeve, means for slidably mounting the sleeve on the handle for translation along an axis normal to the axis of the elongated filament, said means including tubular shell slidably disposed within the sleeve and mounted on the handle, said shell being spaced from the handle to provide an air passage, and said sleeve having openings therein confronting the lamp for circulation of air through the passage, over the lamp, and through the openings in the sleeve, the lamp being disposed within and directly confronting the sleeve, a convex lens mounted on the sleeve in a plane normal to the axis of the sleeve, translation of said sleeve changing the distance between the lens and the filament.

4,004,144

FLUORESCENT LIGHT UNIT

Andre L. Chako, Lancaster, Calif., assignor to A and M Whitemetal Casting, Inc., Lancaster, Calif.

Filed Aug. 22, 1975, Ser. No. 606,858
Int. Cl.² H05B 33/02
U.S. Cl. 240—51.11 R 17 Claims



1. A lighting unit comprising:

a vertically extending centerpost structure;

two vertically spaced top and bottom structures connected to upper and lower portions respectively of said centerpost structure and interconnected thereby and projecting laterally therefrom; and

a generally vertically extending tube disposed about said centerpost structure in spaced relation thereto and engaged and located at its upper and lower ends by said top and bottom structures respectively;

said top and bottom structures extending laterally from said centerpost structure to the location of said tube and including lamp mounting electrical sockets projecting laterally outwardly beyond the tube to positions for mounting a plurality of generally vertical fluorescent lamps at the outside of said tube and at circularly spaced locations thereabout;

said centerpost structure including at least one fluorescent lamp electrical ballast unit connected to the rest of the centerpost structure and located vertically between said top and bottom structures and within said tube with an air circulation space provided at the outside of the ballast unit and between it and said tube;

said top and bottom structures both being open to air flow upwardly therepast at locations radially between said centerpost structure and said tube in a relation providing a continuous upflow path through which circulating air may flow first upwardly past said bottom structure, then upwardly within said tube and about said centerpost structure and said ballast unit to cool the latter, and then upwardly past said top structure and into the atmosphere.

4,004,145

NIL-LUMINANCE LIGHTING PANEL

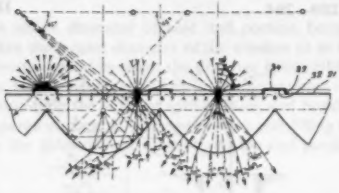
Ignacio Goytisolo Taltavull, Calle Madrazo, 83, Barcelona, Spain

Filed Feb. 24, 1975, Ser. No. 552,148
Int. Cl.² F21V 5/00
U.S. Cl. 240—106 R 6 Claims

1. A low luminance lighting panel comprising:

a panel member having a light-incident surface and a light-emissive surface;

said light-emissive surface having thereon a plurality of refracting prismatic elements of partially spherical dome shape, each having a circular cross-section, an axis of symmetry, and lateral surfaces each defined by lines symmetric to said axis of symmetry, each of said lines being composed of a first circular arc having a center located above the plane of said light-incident surface of said panel member and beyond said axis of symmetry and a second arc tangential to said first arc and having a center located on said axis of symmetry and above the plane of the base of said dome shaped elements, said lateral surfaces of adjacent of said dome shaped elements intersecting so that the bases of said dome shaped elements are square shaped and arranged in orthogonal transverse rows and longitudinal columns respectively parallel to the width and the length of said panel member;



said panel member having in said light-incident surface alternate longitudinal recesses positioned to coincide with the longitudinal columns of square shaped bases of dome shaped elements, and longitudinal raised bands each having an upper surface and lateral edges, said bands positioned to coincide with the longitudinally extending intersection lines between lateral surfaces of said dome shaped elements, said recesses having planar base surfaces;

said upper surface and lateral edges of each of said bands having thereon a coating of an opaque reflecting material; and

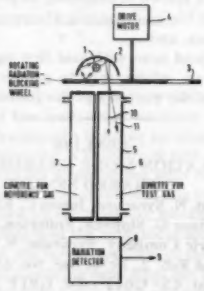
said panel member, said refracting elements and said bands being integrally formed as a single unitary member.

4,004,146

INFRARED GAS ANALYZING PHOTOMETER WITH CHOPPER DESIGNED TO AVOID RADIATION WASTE

Otto Blunck, Hamburg, Germany, assignor to H. Maihak A.G., Hamburg, Germany

Filed Apr. 15, 1975, Ser. No. 568,246
Int. Cl.² G01N 21/34; G01D 5/36
U.S. Cl. 250—345 15 Claims



1. In an infrared gas analyzer, in combination, means defining a first path for reference radiation and a second path for measuring radiation; radiating means operative for emitting radiation towards both said paths simultaneously; detector means positioned at the ends of said paths for sensing the

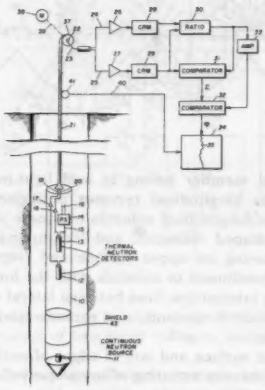
intensity of reference and measuring radiation passing through said paths; and radiation-travel-control means operative for alternately obstructing by the interposition of material which does not transmit the emitted radiation one and then the other of said paths and during the obstructing of each path causing the radiation directed towards the obstructed path to be deflected into the unobstructed path so that such radiation is not wasted.

4,004,147

LOGGING SUBSURFACE FORMATIONS FOR POROSITY

Linus S. Allen, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Sept. 24, 1975, Ser. No. 616,238
Int. Cl.² G01V *5/00*
U.S. Cl. 250—264 **18 Claims**



1. A method of logging the formations traversed by a borehole for porosity, comprising the steps of:

a. locating a source of fast neutrons within the borehole to irradiate the formations with neutrons,

b. measuring the thermal neutron flux of the secondary radiation from the formation at two spaced-apart positions within said borehole,

c. producing a ratio of the thermal neutron flux measured at each of said two positions,

d. combining said ratio with the thermal neutron flux measured at one of said two spaced-apart positions in accordance with a known relationship to produce a first signal indicative of the macroscopic absorption cross section of the formation, and

e. combining said ratio with said first signal in accordance with a known relationship to produce a second signal indicative of the porosity of the formaton.

4,004,148

ACCUMULATION MODE CHARGE INJECTION INFRARED SENSOR

Philip E. Howard, N. Syracuse; James C. Kim, Liverpool, both of N.Y., and Hans G. Sippach, Fullerton, Calif., assignors to General Electric Company, Syracuse, N.Y.

Filed Feb. 2, 1976, Ser. No. 654,512
Int. Cl.² G01J *1/00*; G01T *1/22*
U.S. Cl. 250—370 **6 Claims**

1. An infrared radiation sensor comprising:

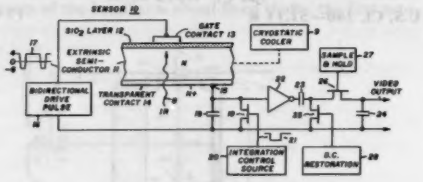
a. a semiconductor substrate of doped semiconductor material upon which IR illumination impinges creating mobile majority carriers and immobile sites of opposite charge,

b. a thin insulating layer applied to one surface of said substrate,

c. a first electrical contact applied to said insulating layer,

d. a second electrical contact to said substrate,

e. cryogenic means for establishing said semiconductor at a temperature providing inadequate thermal energy to ionize the dopant centers, and



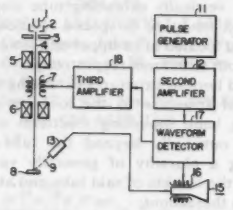
f. a source of bidirectional pulses coupled to said contacts having a first polarity for accumulating said mobile photon induced majority carriers at the oxide-semiconductor interface and a reverse polarity for injecting charges stored at the oxide-semiconductor interface into said second electrical contact.

4,004,149

APPARATUS FOR DISPLAYING IMAGE PRODUCED BY ELECTRICALLY CHARGED PARTICLE BEAM

Seishiro Sato, Hitachi; Toshihiro Furuya, Katsuta, and Yasushi Saito, Mito, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Apr. 18, 1975, Ser. No. 569,293
Claims priority, application Japan, Apr. 22, 1974, 49-44524
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976
Int. Cl.² H01J *3/26*
U.S. Cl. 250—397 **10 Claims**



1. An apparatus for displaying an image produced by electrically charged particle beam, comprising first deflection means for scanning a specimen bi-dimensionally with said electrically charged particle beam, detection means for detecting information signal produced by said specimen illuminated with said electrically charged particle beam, display means for displaying an image of said specimen by utilizing said information signal detected by said detection means, second deflection means provided in said display means, and wave form detection means for detecting the wave form of a deflection signal produced in said second deflection means, whereby said first deflection means is energized by the output signal from said wave form detection means.

4,004,150

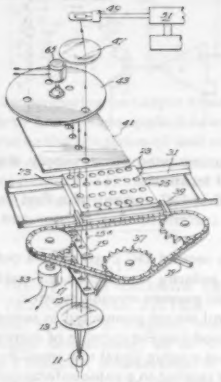
ANALYTICAL MULTIPLE COMPONENT READOUT SYSTEM

Samuel Natelson, 5438 N. Artesian Ave., Chicago, Ill. 60625

Filed May 1, 1975, Ser. No. 573,766
Int. Cl.² G01T *1/00*; G01N *21/26*
U.S. Cl. 250—328 **15 Claims**

1. In an analytical chemical system, an instrument for rapidly analyzing a plurality of components in a single specimen by the measurement of the light intensity emitted from a plurality of solutions using a single detector and light source, so as to translate these light intensities in terms of concentration of chemical components in these solutions, comprising

a. a carrier and travel means, said carrier having a plurality of sample containers in rows thereon disposed to carry said containers which are to hold a specimen along a travel path by said travel means;
b. a work station along said travel path having a light source thereat;
c. light collimating means at said work station for collimating the light emitted from said light source to produce a first beam of the same color as said emitted light;
d. light selection means disposed for receiving said first beam, for selecting a monochromatic beam of light from said collimated light source to produce a second beam;
e. light isolating means for isolating a plurality of narrow third light beams from said collimated monochromatic second beam so disposed as to pass each of these third light beams in a plane through solutions in said plurality of containers so that part of the light is absorbed by samples therein and part transmitted;



f. detector means and focusing means for focusing said transmitted third light beams so as to converge said third light beams to said detector means;
g. interruption scanning means for scanning each of said transmitted third light beams emerging from said solutions sequentially so that said detector means receives said narrow light beams in sequence, said interruption scanning means comprising a disk rotatable about an axis, said disk having a plurality of holes at different radii from the axis of rotation of said disk, each disk positioned to interrupt said transmitted third light beams substantially perpendicular to the plane defined by said transmitted third light beams, wherein said disc sequentially scans a row of sample containers by rotating said disk with respect to said transmitted third light beams; and
h. light reading means for translating the signals of the detector to a written record.

4,004,151

DETECTOR FOR DEEP WELL LOGGING

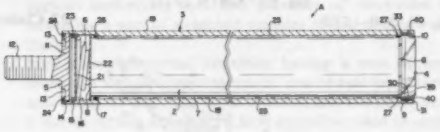
William P. Novak, 15180 Lake Ave., Middlefield, Ohio 44062

Filed May 21, 1975, Ser. No. 579,402

Int. Cl.² G01J *1/58*

U.S. Cl. 250—485 **8 Claims**

1. A hermetically sealed scintillation detector for measuring radiation at successive depths in a bore hole comprising an elongated metal cylinder containing a scintillation crystal of an alkali metal halide, said crystal being coaxial with said cylinder and extending along the length of the cylinder, a round transparent glass window within and closing one end of said cylinder and spaced from the end of said crystal by an optical coupling, said window having a tapered outer surface portion which gradually decreases in diameter in the axial direction away from said crystal, said window having a linear coefficient of thermal expansion which is at least 0.000008 inch per inch per degree Centigrade, the end portion of said cylinder having an inner tapered surface which increases in diameter from the end face of the cylinder toward the crystal



with the inside diameter of said end portion being slightly larger than the largest diameter of the window so as to be able to receive said window when the detector is assembled, and a hermetic heat-resistant epoxy resin sealing annulus bonded to and surrounding the sides of said window and bonded to the inner tapered surface of said end portion and filling the space between the sides of said window and the end portion of the cylinder.

4,004,152

APPARATUS FOR MONITORING A MOVING WEB OF MATERIAL FOR FAULTS

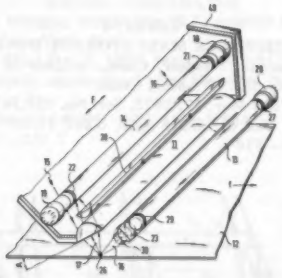
Werner Obser, Geretsried, and Gernot Pinior, Olching, both of Germany, assignors to Erwin Sick GmbH Optik-Elektronik, Waldkirch, Germany

Filed July 7, 1975, Ser. No. 593,399

Claims priority, application Germany, July 12, 1974, 2433683

Int. Cl.² G01N *21/32*

U.S. Cl. 250—562 **14 Claims**



1. Apparatus for inspecting a substantially flat surface portion of a material for faults or aberrations which affect the remission and reflection of a light ray incident on the material, the apparatus comprising: a cylindrical lens positioned in the path of the light ray for focusing the light ray on the surface portion of the material and for intercepting light from the light ray which is remitted by the material; means for scanning the light ray over the length of the cylindrical lens to thereby scan the light ray across the surface portion of the material; a light conducting rod for capturing light from the light ray remitted by the material, the light conducting rod being positioned on the side of the cylindrical lens opposite the material so that remitted light captured by the rod first passes through the cylindrical lens; and means in light communication with at least one end face of the light conducting rod for generating an electrical output signal responsive to the remitted light captured by the rod.

4,004,153

APPARATUS FOR MONITORING A WEB OF MATERIAL

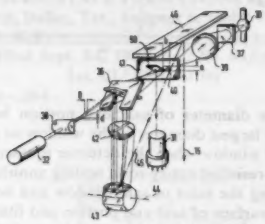
Werner Obser, Geretsried, and Gernot Pinlor, Olching, both of Germany, assignors to Erwin Sick GmbH Optik-Elektronik, Waldkirch, Germany

Filed July 7, 1975, Ser. No. 593,400

Claims priority, application Germany, July 12, 1974, 2433682

Int. Cl.² G01N 21/32

U.S. Cl. 250—572 22 Claims



1. Apparatus for inspecting a substantially flat surface portion of a material for faults which affect the remission and reflection of light incident on the material, the apparatus comprising: a first light source emitting light of a relatively narrow spectral band width; a second light source remitting light of a relatively broad spectral band width; means for projecting the light from the first and second light sources onto the material in the form of first and second, overlapping each other differing light spots, respectively; first and second light sensitive means for generating output signals responsive to light received and sensed by the light sensitive means; means for directing light from the spots on the material to the light sensitive means; and means for limiting the output signals of the first and second light sensitive means to light generated by the first and second light sources, respectively.

4,004,154

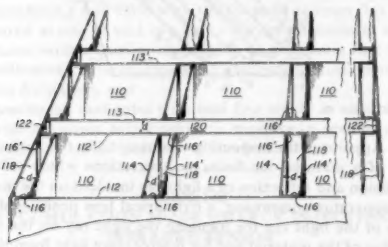
FISSIONABLE MASS STORAGE DEVICE

Frank Bevilacqua, Windsor, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Mar. 17, 1975, Ser. No. 558,767

Int. Cl.² G21F 3/00; G21C 11/00

U.S. Cl. 250—518 6 Claims



1. An apparatus for the safe yet compact storage of a plurality of fissionable masses comprising:

a. a plurality of adjacent discrete neutron absorbing open-ended shields disposed in side-by-side relationship, one of each of which is adapted to parametrically encircle one of each of said plurality of fissionable masses, said neutron absorbing shields consisting of stainless steel having a thickness in the range from .3 centimeters to 1.4 centimeters;

b. spacing means in each of two directions for spacing each of said side-by-side neutron absorbing shields from the next adjacent neutron absorbing shield by a predetermined neutron attenuation distance of at least 9.5 centimeters; and

c. hydrogenous moderating means between said adjacent discrete neutron absorbing shields for moderating neutrons which are emitted from said fissionable masses.

4,004,155

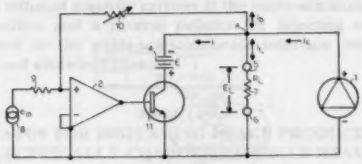
BIPOLAR REGULATED HIGH VOLTAGE POWER SUPPLY

Sarkis Nercessian, Flushing, N.Y., assignor to Forbro Design Corporation, New York, N.Y.

Filed Oct. 3, 1975, Ser. No. 619,444

Int. Cl.² H02J 3/38

U.S. Cl. 307—52 5 Claims



1. In a bipolar regulated power supply, the combination of;

a pair of load terminals;

a source of first DC current of a first polarity connected through a current sensing resistor and across said load terminals;

a source of a second DC current of a polarity opposite to said first polarity connected to said load terminals through said current sensing resistor;

current control means connected in series with said source of said second current capable of controlling said second current from a value equal to a small fraction of the value of said first current to a value substantially twice the value of said first current whereby bipolar voltage or current is provided to said terminals;

wherein said control means includes; a voltage control amplifier for receiving a sample of the terminal voltage and comparing it with a first bipolar reference for controlling the voltage across said terminals in accordance with said comparison; a current control amplifier for receiving a sample of the terminal current and comparing it with a second bipolar reference for controlling the current to said terminals in accordance with said comparison; adjustable positive overvoltage control means; adjustable negative overvoltage control means; adjustable positive overcurrent control means; adjustable negative overcurrent control means;

and means for exclusively selecting control by said voltage control amplifier or said current control amplifier while retaining all four overvoltage or overcurrent control means.

4,004,156

SINGLE BUS DC CONTROL CIRCUIT

Ronald M. Schuller, 552 Treadway Blvd., Sheffield Lake, Ohio 44054

Filed Nov. 26, 1975, Ser. No. 635,332

Int. Cl.² H01H 19/64

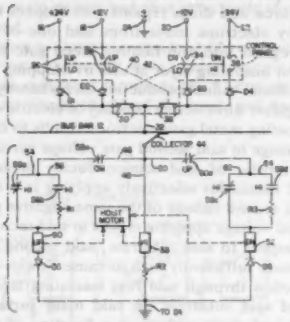
U.S. Cl. 307—113 15 Claims

1. A DC control circuit comprising:

a bus bar;

a primary circuit including a DC voltage source of high and low positive and of high and low negative voltage, selector means operatively connected between said bus bar and said voltage source for selectively applying said high or low positive or negative voltage to said bus bar; f

a secondary circuit including collector means for making electrical contact with said bus bar and a voltage polarity and voltage level responsive circuit operatively connected to said collector means including polarity means for producing an output condition indicative of the polarity of voltage applied to said bus bar and voltage



level means for producing an output condition indicative of a said high or low voltage applied to said bus bar and; means responsive to the operation of said secondary circuit for operating a device in a mode corresponding to said polarity means output condition and at a rate corresponding to said voltage level means output condition.

4,004,157

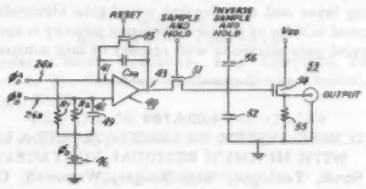
OUTPUT CIRCUIT FOR CHARGE TRANSFER TRANSVERSAL FILTER

Richard D. Baertsch; William E. Engeler, both of Scotia, and Jerome J. Tiemann, Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Sept. 2, 1975, Ser. No. 609,497

Int. Cl.² H03K *5/20;* **G11C** *19/28*

U.S. Cl. 307—235 C **11 Claims**



1. A transversal filter comprising

a substrate of semiconductor material of one conductivity type,

a first plurality of electrodes insulatingly overlying said substrate, each split into a first and a second part with a gap therebetween,

a second plurality of electrodes insulatingly overlying said substrate, each spaced between adjacent electrodes of said first plurality, said first and second pluralities of electrodes forming a plurality of stages of a shift register,

means for connecting the first parts of said electrodes of said first plurality to a first conductive line,

means for connecting the second parts of said electrodes of first plurality to a second conductive line,

means for introducing packets of charge representing successive samples of an analog signal into said shift register,

charge clocking means to effect the transfer of charge from storage region to storage region underlying said first and said second pluralities of electrodes including means for applying first and second phase related voltages to said first and second pluralities of electrodes respectively, said first voltage being applied to said first and said second lines, said second voltage having a predetermined periodicity,

differential sensing means connected to said first and second lines for detecting a difference in signal on said lines in response to the transfer of charge from storage regions underlying said second plurality of electrodes to storage regions underlying said first plurality of electrodes for obtaining a sum of weighted samples of said analog signal including

a high gain differential amplifier having a pair of input terminals and an output terminal, one of said input terminals being an inverting input terminal and the other being a non-inverting terminal, a first capacitor, said inverting terminal connected to said output terminal through said first capacitor and also connected to said first line, said non-inverting terminal connected to said second line,

a source of said first phase related voltage,

a first and a second charging and isolating means, said connecting said source to said first and second lines respectively to charge each of said lines to substantially the value of said first phase related voltage of said source periodically prior to the transfer of charge into the storage regions underlying said first plurality of electrodes and thereafter isolating said lines from said source,

whereby charge periodically transferred from the storage regions underlying said second plurality of electrodes to storage regions underlying said first plurality of electrodes induce different voltages on said lines and causes the voltage of the inverting terminal to follow the voltage of the non-inverting terminal by virtue of the feedback through said first capacitor and a total charge is supplied to said first capacitor which is proportional to the difference in charge delivered to said lines during said transfer of charge, said total charge appearing as a change in voltage at said output terminal.

4,004,158

KEYED COMPARATOR

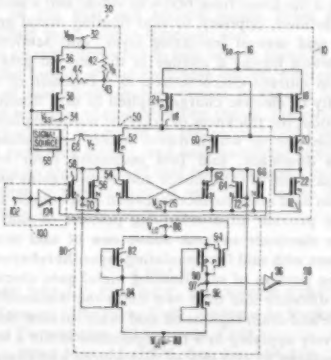
David Keith Morgan, Flemington, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 6, 1975, Ser. No. 619,912

Claims priority, application United Kingdom, Nov. 26, 1974, 51173/74

Int. Cl.² H03K *5/20, 1/12;* **H03F** *3/04*

U.S. Cl. 307—235 T **6 Claims**



1. The combination of:

a comparator comprising first and second conduction paths connected in parallel between first and second terminals, two control electrodes, one coupled to each path, for controlling the impedance of the respective conduction paths, means for applying a reference signal to one elec-

trode, means for applying the signal to be compared with the reference signal to the other electrode, output means in at least one of the paths, and a current source connected between said first and second terminals; and

means responsive to the amplitude of said reference signal for controlling the amount of current supplied by said current source to said comparator.

4,004,159

ELECTRICALLY REPROGRAMMABLE NONVOLATILE FLOATING GATE SEMI-CONDUCTOR MEMORY DEVICE AND METHOD OF OPERATION

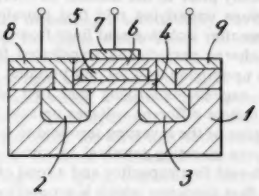
Yasuki Rai, Kyoto; Terutoshi Sasami, Osaka; Yuzuru Hasegawa, Osaka, and Masaru Okazoe, Osaka, all of Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi, Japan

Continuation-in-part of Ser. No. 469,616, May 13, 1974, abandoned. This application Nov. 3, 1975, Ser. No. 628,430

Claims priority, application Japan, May 18, 1973, 48-56620; Jan. 16, 1974, 49-7748

Int. Cl.² H03K *5/00;* **H01L** *29/78, 27/02, 29/34*

U.S. Cl. 307—238 **9 Claims**



1. A semiconductor memory device comprising a semiconductor substrate of an N conductivity type having a main surface, source and drain regions of P conductivity type spaced apart on said main surface of said semiconductor substrate, whereby PN junctions are formed between said substrate and said source and drain regions, said junctions having a breakdown point at a determinable reverse bias voltage applied therebetween, a first insulating layer formed on said main surface of said semiconductor substrate at least in an area between said source and drain regions and having a thickness from 200A to 400A, a floating metal gate electrode formed on said first insulating layer above said area on said main surface between said source and drain regions, a second insulating layer formed on said floating metal gate electrode and having a thickness from 600A to 900A, and a second gate electrode formed, opposite to said floating metal gate electrode, on said second insulating layer, said semiconductor memory device having a change in the second gate voltage versus drain current characteristic as a function of the type and quantity of electric charge applied to said floating metal gate electrode, the thickness of said first insulating layer being greater than that at which direct tunnel conduction therethrough is dominant, said first insulating layer extending above at least one of said source and drain regions and above said area on said main surface between said source and drain regions, to provide an overlapping portion of said floating metal gate electrode at least above one of said source and drain regions with said first insulating layer therebetween, said overlapping portion of said floating metal gate electrode extending a distance less than two times the distance between said source and drain regions on said main surface, first means for selectively applying in a first operation mode a voltage of negative polarity to said one of said source and drain regions with respect to said substrate and said second gate electrode, whereby a reverse bias voltage may be applied to the PN junction between said substrate and said one of said source and drain regions, said reverse bias voltage having a value lower than said breakdown voltage of said PN junction but sufficient enough to produce an electric field of less than 10^7V/cm to permit Fowler-Nordheim tunnel conduction through said first insulating layer at said overlapping portion between said floating metal gate electrode and said one of said source and drain regions as a function of the electric field thereby applied across said first insulating layer at said overlapping portion and determined by the potential difference between the potential at said floating metal gate electrode with respect to said substrate and the potential at said one of said source and drain regions with respect to said substrate, whereby electrons move from said one of said source and drain regions into said floating metal gate electrode through said first insulating layer at said overlapping portion by Fowler-Nordheim tunnel conduction and whereby a first change in the negative direction in quantity of electric charge applied to said floating metal gate electrode results to cause a respective first change in said second gate voltage versus a drain current characteristic of said semiconductor memory device, and second means for selectively applying in a second operation mode a second voltage of the same negative polarity as that of said first voltage applying means to said second gate electrode with respect to said substrate, said second voltage having a magnitude sufficiently high to cause Fowler-Nordheim tunnel conduction through said first insulating layer above said region of said substrate on said main surface between said source and drain regions as a function of the electric field applied across the first insulating layer above said area on said main surface between said source and drain regions determined by the potential at said floating metal gate electrode with respect to said substrate and the potential at said second gate electrode with respect to said substrate, whereby electrons move from said floating metal gate electrode into said region of said substrate on said main surface between said source and drain regions through said first insulating layer above said region by Fowler-Nordheim tunnel conduction and whereby a second change in the positive direction in the quantity of electric charge applied to said first gate electrode results to cause a respective second change, in the second gate voltage versus drain current characteristic of said semiconductor memory device, said second change being in the direction opposite to said first change, the metal of said floating metal gate electrode facilitating movement of electrons from said floating metal gate electrode toward said region of said substrate on said main surface between said source and drain regions by virtue of an image force exerted between said first insulating layer and said floating metal gate electrode when said second voltage of the same negative polarity is applied to said second gate electrode with respect to said substrate.

4,004,160

SWITCHING SYSTEM TO SHORT-CIRCUIT A LOAD WITH MINIMUM RESIDUAL VOLTAGE

Klaus Streit, Tubingen; Karl Staiger, Wannweil; Gerhard Conzelmann, Leinfelden; Hartmut Seiler, Reutlingen, and Karl Nagel, Gomaringen, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Sept. 12, 1974, Ser. No. 505,470

Claims priority, application Germany, Sept. 28, 1973, 2348765

Int. Cl.² H03K *17/00*

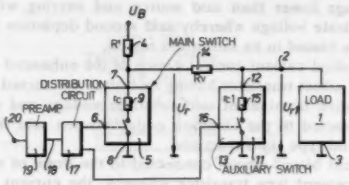
U.S. Cl. 307—253 **24 Claims**

1. Switching system to short-circuit a load (1) under command of a control signal, in which the load (1) is connected to a source (U_B), the system having a main switch (5, 105, 205, 305, 405) connected in parallel with the terminals (6, 106, 206, B) effecting opening or closing of the switch under control of said command signal applied to the control terminal, comprising

a voltage divider circuit (FIGS. 3 and 10: 14, 15; FIGS. 4, 5, 7, 8, 9, 11: 114, 115; FIG. 12: 214, 215; FIGS. 18, 19, 20: r_{CC1}, r_{CL1} - r_{CE}; FIGS. 21, 22, 23: r_{CLAB}, r_{CEB}; r_{CLBC}, r_{CEC}) including two impedance means connected across the main switch electrodes (7, 8; 107, 108; 207, 208; C, E; C, - E) of the main switch, the load being connected to the

voltage division, or tap point of the voltage divider circuit, the impedance means of the voltage divider circuit in parallel with the load (1) being controllable between a high, or effectively open circuit value and a low value, in synchronism with open and closed circuit condition of the main switch (5, 105, 205, 305, 405), to reduce any residual voltage applied to the load (1) due to voltage drop across the main switch electrodes of the main switch upon closing of the main switch and thus effectively short-circuiting the load.

4. Switching system to short-circuit a load (1) connected to a source (U_B) having a controlled main semiconductor switch (5) having its main switching terminals (7, 8) connected in parallel with the terminals (2, 3) of the load, and having a



control terminal (6) effecting opening or closing of the control switch under control of a control signal applied to the control terminal (6), comprising

a second semiconductor controlled switch (11) connected and controlled to switch in synchronism with said main switch (5);

and a two-terminal impedance means (14),

the second semiconductor controlled switch (11) having its main switching electrodes (12, 13) connected across the terminals of the load (1) and said impedance means (14) being connected between one of the main switching electrodes (12) of the second semiconductor controlled switch (11) and hence to one terminal (2) of the load, and one of the main switching terminals of the main switch (5).

4,004,161

RECTIFYING CIRCUITS

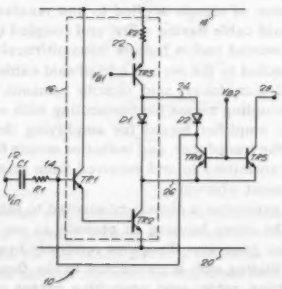
Alan Ryder, Church Crookham, near Aldershot, England, assignor to The Solartron Electronic Group Limited, Farnborough, England

Filed Oct. 28, 1975, Ser. No. 626,144

Claims priority, application United Kingdom, Nov. 8, 1974, 48359/74

Int. Cl.² H02M 7/217

U.S. Cl. 307—261 **6 Claims**



1. A rectifying circuit comprising a high gain A.C. amplifier for receiving an A.C. input singal to be rectified, first and second rectifying means connected in respective negative feedback paths between the output of the amplifier and its input, said paths being arranged to pass respective feedback currents of opposite polarity, and current copying means responsive to the signal applied by the amplifier to one of the rectifying means to pass a current substantially proportional to the feedback current in said one rectifying means, the rectified output signal from the circuit being derived from the current copying means.

4,004,162

CLOCK SIGNAL REPRODUCING NETWORK FOR PCM SIGNAL RECEPTION

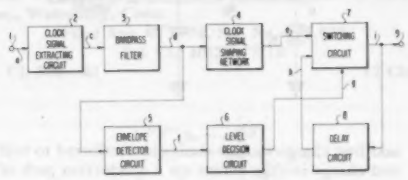
Kotaro Kato, and Haruki Takai, both of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Jan. 22, 1976, Ser. No. 651,369

Claims priority, application Japan, Jan. 25, 1975, 50-10171

Int. Cl.² H03K 3/78

U.S. Cl. 307—269 **5 Claims**



1. A clock signal reproducing network for PCM signal reception comprising:

a clock signal component extracting circuit for extracting the clock signal component from a received digital signal in a baseband;

a bandpass filter connected to the output of said clock signal component extracting circuit for band-limiting the output thereof to derive a sine wave signal of the clock frequency;

a clock shaping circuit connected to the output of said bandpass filter for shaping said sine wave signal into a square wave signal;

an envelope detection circuit connected to the output of said bandpass filter for detecting the envelope of the output of said bandpass filter;

a level decision circuit connected to the output of said envelope detection circuit for comparing the output level of said envelope detection circuit with a reference level;

a switching circuit having first and second input terminals, one of the first and second inputs being selectively switched to an output terminal; and

a delay circuit connected to said output terminal for delaying the output of said switching circuit; wherein the output of said clock shaping circuit is applied to the first input terminal of said switching circuit, the output of said delay circuit is applied to the second input terminal of said switching circuit, and said switching circuit is controlled by the output of said level decision circuit so that the first or second input is selectively led to the output terminal.

4,004,163

TIME DELAY, CHARGE, TRANSFER CIRCUIT

John R. Spence, Villa Park, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Mar. 11, 1976, Ser. No. 666,116

Int. Cl.² H03K 5/13, 17/56

U.S. Cl. 307—293 **7 Claims**

1. A charge transfer circuit comprising,

first and second charge storage means,

transmission gate means selectively connected between said first and second charge storage means,

clock terminal means connected to the first charge storage means and to a control electrode of said transmission gate means,

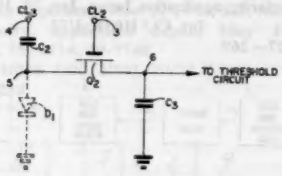
a source of reference potential, and

unidirectional current conducting means,

said second charge storage means connected between said transmission gate means and said source of reference potential,

said unidirectional current conducting means connected between said first charge storage means and said source of reference potential,

said first charge storage means and said control electrode of said transmission gate means each receiving respective clock signals having an active level to charge said first charge storage means and enable said transmission gate means during a first interval of time, whereby the signal of



said first charge storage means is transferred to said second charge storage means via a conduction path of said transmission gate means,

the respective clock signal of said first charge storage means remaining at the active level and the respective clock signal at said transmission gate means control electrode having an inactive level to disable said transmission gate means and thereby isolate said second charge storage means from said first charge storage means during a succeeding second interval of time, and

each of the respective clock signals at said first charge storage means and said transmission gate means control electrode having an inactive level during a succeeding third interval of time, whereby said first charge storage means is selectively discharged to said source of reference potential via the conduction path of said unidirectional current conducting means.

4,004,164

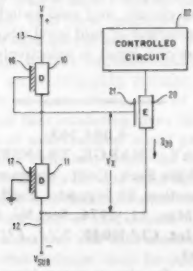
COMPENSATING CURRENT SOURCE

Hayden Clavie Cranford, Jr., Durham, and Charles Reeves Hoffman, Raleigh, both of N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 18, 1975, Ser. No. 641,797

Int. Cl.² H03K *1/14*; H03F *3/16, 1/30, 3/45*

U.S. Cl. 307—297 **3 Claims**



1. A field effect transistor circuit suitable for incorporation on a semiconductor substrate with other field effect transistor circuits of an analog type and in which substrate a biasing voltage is subject to variations within a tolerance range, said circuit acting to compensate for voltage changes in the inputs or outputs of said other circuits due to variations in said substrate biasing voltage and comprising:

an FET depletion type of transistor deposited in said substrate and having its source connected to the negative terminal of said substrate voltage and its gate connected to a ground level reference voltage and thereby biased in its linear region of operation,

a second depletion type transistor deposited in said substrate and having its source connected to the drain of said first FET depletion type transistor and with its drain connected to a voltage source which is positive with respect to said substrate voltage, and having its gate connected to its source or to a voltage point having a voltage lower than said source and varying with said substrate voltage whereby said second depletion transistor is biased in its saturation region,

a deposited current control device of the enhanced type of field effect transistor having its source connected to said negative terminal of said substrate voltage and its gate connected to the common node between said first and second type transistors and

a current biased circuit connected to the drain of said enhancement type transistor whereby, the current in said biased circuit is inversely related to the magnitude of said substrate voltage.

4,004,165

ULTRASONIC SIGNAL GENERATORS

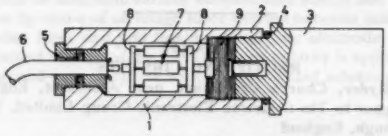
Ivo Leo Bredael, Ispra, Varese, and Fulvio Laghi, Varese, both of Italy, assignors to European Atomic Energy Community (Euratom), Kirchberg, Luxembourg

Continuation of Ser. No. 454,850, March 26, 1974, abandoned. This application July 7, 1975, Ser. No. 593,212

Claims priority, application United Kingdom, Mar. 27, 1973, 14735/73

Int. Cl.² H01L *41/04*

U.S. Cl. 310—8.1 **1 Claim**



1. In an ultrasonic flow detector of the kind comprising a piezoelectric crystal transducer, a pulse generator having capacitive means and switching means periodically discharging said capacitive means for generating repetitive voltage pulses for excitation of the transducer; a transmitting cable for the transmission of signals applied to and received from said transducer, said cable having a first end coupled to said transducer and a second end; a remote transmit/receive unit electrically connected to the second end of said cable and by said cable to said transducer, said remote transmit/receive unit comprising coupling means for connecting with a D.C. power source, pulse amplifier means for amplifying the signals received from the transducer, and indicator means for indicating the signals transmitted to and received from said transducer; the improvement wherein

said pulse generator is closely connected to said transducer within the same housing to provide an oscillating unit, said pulse generator dissipates relatively low power, and said oscillating unit is connected to the first end of said transmitting cable; said capacitive means of said pulse generator has a reactance substantially equal to the reactance of said crystal transducer at the resonant frequency of said transducer; and said pulse generator includes

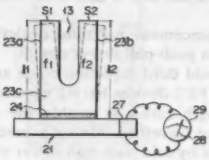
resistive means having a magnitude matching the impedance of said cable to said transducer, and voltage limiting means, said resistive means and said voltage limiting means being coupled across said transducer.

4,004,166

METHOD FOR STABILIZING THE VIBRATION FREQUENCY OF A TUNING FORK-TYPE QUARTZ CRYSTAL OSCILLATOR

Hozumi Nakata, Iruma, Japan, assignor to Nihon Dempa Kogyo Co., Ltd., Tokyo, Japan

Filed Mar. 12, 1975, Ser. No. 557,523
Int. Cl.² H01L 41/08
U.S. Cl. 310—8.2 **3 Claims**



1. A method for stabilizing the vibration frequency of an oscillator which contains a tuning fork-type quartz crystal element comprising a pair of arms having mutually facing ends, each arm having a given size, and a common connecting section connecting the mutually facing ends of the paired arms,

the method comprising:

bonding only substantially the whole bottom surface of the common connecting section of said tuning fork-type quartz crystal element directly to a base member supporting the same by an adhesive agent;

mechanically vibrating the paired quartz crystal arms and sensing the amount of vibration energy leaking from the common connecting section of said quartz crystal element into the base member while the paired quartz crystal arms are mechanically vibrating; and

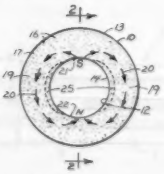
minimizing said leaking vibration energy by repeatedly adjusting the sizes of the paired quartz crystal arms.

4,004,167

PERMANENT MAGNET STATORS

John H. Meckling, Altamonte Springs, Fla., assignor to Magna Motors Corporation, Altamonte Springs, Fla.

Filed Jan. 29, 1975, Ser. No. 545,173
Int. Cl.² H02K 21/06
U.S. Cl. 310—154 **6 Claims**



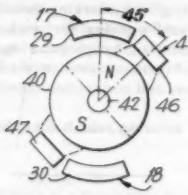
1. A stator for a dynamoelectric machine comprising a one piece annular member having an axis and a hollow extending along the axis for the reception of a rotatable member of the machine, said annular member having inner and outer peripheral surfaces which are radially offset from said axis and radially spaced apart, said annular member comprising magnetically anisotropic particles of magnetically attractable ferrite material which are embedded in a matrix of hardened synthetic plastic material, said particles being magnetically aligned and permanently magnetized along a return flux path that extends in the member between arcuate pole faces which are of opposite polarity and circumferentially spaced apart at the inner peripheral surface of the annular member, said annular member having an arcuate region of substantially uniform concentration of said particles in the matrix material and which extends along the flux path and is continuous between said pole faces, said region being located radially outwardly of the inner peripheral surface in the arcuate space between said pole faces, and said member having another region in the arcuate space between said pole faces and which is located between said arcuate region and the inner peripheral surface, such other region having a concentration of said particles which is less than the concentration thereof in said arcuate region.

4,004,168

ELECTRIC ROTATING MACHINE

Arthur W. Haydon, Middlebury, Conn., assignor to Tri-tech, Inc., Waterbury, Conn.

Filed Aug. 8, 1974, Ser. No. 495,928
Int. Cl.² H02K 7/118
U.S. Cl. 310—41 **12 Claims**



1. An electric rotating machine comprising, in combination:

a permanent magnet rotor having a plurality of rotor poles of opposite magnetic polarity;

pole piece means including a pair of salient stator poles in magnetic flux relationship with the rotor, the stator poles being provided with integral extensions which form the electrical terminals of the machine;

winding means for energizing the salient stator poles with magnetic flux, so that a given moment the stator poles are of opposite magnetic polarity;

means defining a return path of given reluctance for the stator pole flux; and

detend means including a pair of auxiliary pole members in magnetic flux relationship with the rotor and a magnetic return path having a reluctance lower than the given reluctance of the stator pole flux return path, each of the auxiliary pole members being angularly spaced in a given direction from an adjacent stator pole, the rotor being adapted consistently to assume a position, when the winding means is de-energized, in which each rotor pole is opposite one of the auxiliary pole members and is angularly spaced from the stator poles, said rotor consistently starting in said given direction when the winding means is energized.

4,004,169

HOLDER FOR ANCHORING LEADS TO DYNAMOELECTRIC MACHINES

Thomas Charlton, Lima, Ohio, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

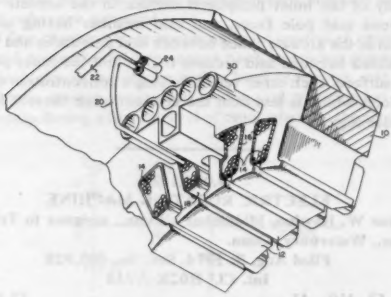
Filed Apr. 23, 1975, Ser. No. 570,891
Int. Cl.² H02K 11/00
U.S. Cl. 310—71 **6 Claims**

1. In a dynamoelectric machine having a stator core with a plurality of teeth between which are supported insulated con-

ductors forming a stator winding, the improvement comprising:

an insulating holder for supporting and anchoring a metallic connection member that joins the insulated wire conductor of the stator winding and a lead-in conductor;

said holder including a body with a plurality of openings therein, each of said openings being defined by a closed band of material at the entrance thereto and a slotted



band of material adjacent said closed band, said slotted band terminating with a locking shoulder extending transversely into said opening for anchoring in place said connection member by pressure against the rearward surface thereof upon occurrence of a force tending to pull said conductors and connection member from said opening;

and means for securing said holder directly to the stator core.

4,004,170

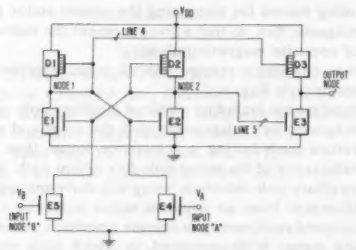
MOSFET LATCHING DRIVER

John David Henke, Catlett, Va., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 29, 1975, Ser. No. 572,761

Int. Cl.² H03K *3/286, 3/353, 5/20, 17/56*

U.S. Cl. 307—279 **3 Claims**



1. A MOSFET latching driver circuit having a predetermined down-voltage level and a symmetrical rise-time and fall-time in its output signal waveform and a predetermined level of noise immunity, comprising:

a first depletion mode FET device serving as a load and having a drain connected to a supply voltage and a gate and a source connected to a first node;

a first enhancement mode FET device having a drain connected to said first node, a source connected to a ground potential, and a gate connected to a second node;

a second depletion mode device serving as a load and having a drain connected to said supply voltage and a gate and a source connected to said second node;

a second enhancement mode FET device having a drain connected to said second node, a source connected to said ground potential, and a gate connected to said first node;

said first and second enhancement mode and said first and second depletion mode devices comprising a bistable latching circuit;

said first depletion mode FET device and said first enhancement mode FET device having substantially the same predetermined ratio of gate width-to-length ratios as that for said second depletion mode device and said second enhancement mode device, imparting to said bistable circuit a predetermined noise immunity;

a third depletion mode FET device having a drain connected to said supply voltage, a source connected to an output node, and a gate connected to said first node;

a third enhancement mode FET device having a drain connected to said output node, a source connected to said ground potential, and a gate connected to said second node;

said third enhancement and third depletion mode devices comprising a push-pull driver circuit;

said gates of said third depletion mode and third enhancement mode FET devices having a predetermined ratio of width-to-length ratios to enable the generation of an output signal waveform having a predetermined down-voltage level by said push-pull driver circuit;

said gate of said first depletion mode FET device having a predetermined different area dimension from that of said second depletion mode FET device and said gate of said first enhancement mode FET device having a predetermined different area dimension from that of said second enhancement mode FET device to provide a predetermined different magnitude of charging current to said gate of said third depletion mode FET device, with respect to the magnitude of charging current to said gate of said third enhancement mode FET device, to compensate for a difference in the gate capacitance of said third enhancement mode and third depletion mode FET devices, thereby enabling the generation of an output signal waveform having a symmetrical rise-time and fall-time.

4,004,171

GAS-AND/OR VAPOR DISCHARGE LAMP

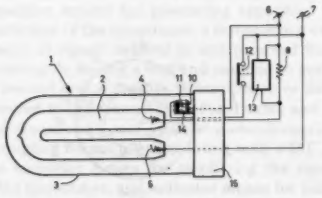
Jean Johan Heuvelmans; Hendricus Franciscus Joannes Jacobus van Tongeren, and Jan Evert Van der Werf, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 22, 1976, Ser. No. 668,827

Claims priority, application Netherlands, Apr. 1, 1975, 7503825

Int. Cl.² H01J *61/24*

U.S. Cl. 313—15 **4 Claims**



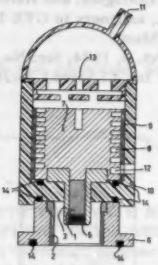
1. Gas and/or vapour discharge lamp provided with a discharge tube and an outer bulb which envelops this tube, means being present to change the heat insulation in the space between the discharge tube and the outer bulb, characterized in that this means consists of a reversible hydrogen getter which is located in the space between the discharge tube and the outer bulb of the lamp, whereby this getter releases hydrogen if its temperature increases and absorbs hydrogen if its temperature decreases.

4,004,172

GAS DISCHARGE ELECTRON GUN FOR GENERATING AN ELECTRON BEAM BY MEANS OF A GLOW DISCHARGE

Theodorus Maria Berendina Schoenmakers, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 8, 1975, Ser. No. 575,615
Claims priority, application Netherlands, May 27, 1974, 7407059
Int. Cl.² H01J 17/04
U.S. Cl. 313—217 7 Claims



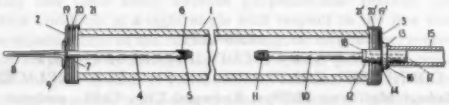
1. A gas discharge electron gun for generating an electron beam by means of a glow discharge, comprising, within an envelope, means to produce a gaseous ionizable medium, a tubular anode defining two open ends, a cathode arranged coaxially with said anode and having an active surface from which electrons are released by secondary emission in such a quantity as to form a beam composed mainly of the secondary electrons, and a conductive sleeve connected to said cathode around said active surface and projecting toward an open end of said anode.

4,004,173

NIOBIUM ALUMINA SEALING AND PRODUCT PRODUCED THEREBY

Sydney Alfred Richard Rigden, 28, Wayside Avenue, Bushey Heath, Hertfordshire, England

Filed Dec. 27, 1965, Ser. No. 516,345
Int. Cl. H01j 5/04
U.S. Cl. 313—317 6 Claims



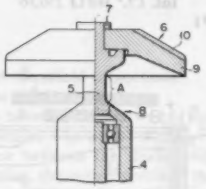
1. A sodium vapor electric discharge lamp having a discharge envelope consisting of a tube formed of light-transmissive sintered polycrystalline alumina, which tube is closed at each end by a niobium closure member carrying an electrode, said closure member being fitted over the open end of the tube and hermetically bonded to the end surface of the tube by alloying of niobium of the closure member with a bonding medium consisting of an alloy of titanium, vanadium and zirconium in the proportions of 68% zirconium, 14% vanadium and 18% titanium by weight.

4,004,174

ROTARY ANODE STRUCTURE FOR AN X-RAY TUBE

Hideo Yashiro, Tokyo, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Tokyo, Japan

Filed Nov. 1, 1974, Ser. No. 520,228
Claims priority, application Japan, Nov. 2, 1973, 48-122894
Int. Cl.² H01J 35/08
U.S. Cl. 313—330 10 Claims



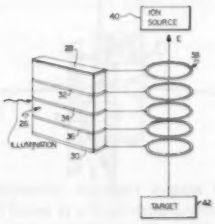
1. A rotary anode structure for an X-ray tube comprising a rotary target including a substrate and an electron receiving layer, said substrate being made of a Mo based alloy containing in an amount of 0.5 to 2.0% by weight a metal therefor selected from the group consisting of titanium, zirconium and a mixture thereof, said electron receiving layer being made of one selected from the group consisting of tungsten and a W based alloy in which said alloy forming the substrate further includes silicon and potassium in an amount of 0.05 to 0.015% by weight.

4,004,175

HIGH VOLTAGE PARTICLE ACCELERATOR UTILIZING POLYCRYSTALLINE FERROELECTRIC CERAMIC MATERIAL

Philip S. Brody, Brookmont, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation-in-part of Ser. No. 533,365, Dec. 16, 1974, which is a continuation-in-part of Ser. No. 411,853, Nov. 1, 1973, Pat. No. 3,855,004. This application Dec. 9, 1975, Ser. No. 639,023
Int. Cl.² H05H 5/00
U.S. Cl. 313—360 6 Claims



1. In an apparatus for accelerating charged particles including means for generating a high voltage electric field, a source of charged particles which are accelerated through said field, and a target towards which said accelerated particles are directed, the improvement wherein said means for generating a high voltage electric field comprises a substrate of a polycrystalline ferroelectric ceramic material, said substrate having been electrically polarized by the application thereacross of a voltage pulse such that said substrate displays a remanent polarization; and a source of electromagnetic radiation impinging upon the material of said substrate, whereby said substrate produces said high voltage electric field.

4,004,176

STRIPE-SHAPED COLOR SEPARATION FILTER FOR IMAGE PICKUP TUBE AND METHOD FOR MANUFACTURING THE SAME

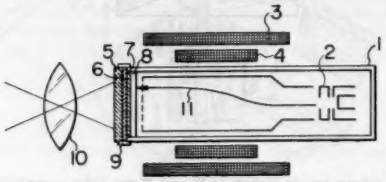
Mitsuru Otake, and Saburo Nobutoki, both of Mobara, Japan, assignors to Hitachi, Ltd., Japan

Filed Sept. 21, 1973, Ser. No. 399,745

Claims priority, application Japan, Oct. 16, 1972, 47-102672; Oct. 16, 1972, 47-102673

Int. Cl.² H01J 29/36

U.S. Cl. 313—371 **31 Claims**



1. A stripe-shaped color separation filter for use with an image pickup tube comprising a transparent substrate serving as a window of said image pickup tube, a first group of spaced filter elements provided at predetermined positions on said substrate for preventing light of a first color from passing therethrough, and a second group of spaced filter elements provided at predetermined positions on said first group of filter elements in partially superimposed relationship for preventing light of a second color from passing therethrough, and a layer of a transparent material transparent to substantially all light provided on and between said filter elements, said layer having a surface thereof which is flat enough to be practical for use with said image pickup tube.

4,004,177

TELEVISION CAMERA TUBE TARGET SUPPORT

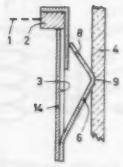
Jan Otto van Hattum, and Willem Antonius Maria Hamersma, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed June 25, 1975, Ser. No. 590,316

Claims priority, application Netherlands, July 25, 1974, 7410035

Int. Cl.² H01J 29/02, 31/38

U.S. Cl. 313—390 **3 Claims**



1. A television camera tube comprising an evacuated envelope which is substantially cylindrical and has in one end an electron gun and at the other end a face plate with a photosensitive layer, in front of which layer an electrode is provided which is secured to a cylindrical sleeve which is supported in the envelope by means of resilient elements, which resilient elements are secured to the said cylindrical sleeve with one end and have such a bent shape that they press against the cylindrical sleeve with their other end, a bent part of the resilient elements between the two ends forming a point of contact which presses against the wall of the envelope, and the longitudinal orientation of the resilient elements being substantially parallel to the axis of the cylindrical sleeve and the length of the resilient elements being larger than half the length of the cylindrical sleeve, the said points of contact forming bends which engage in a recess in the wall of the envelope.

4,004,178

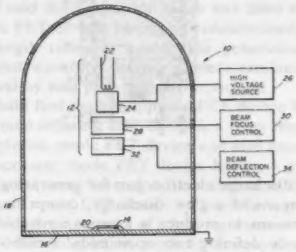
WHITE LIGHT SOURCE

Leslie A. Riseberg, Sudbury; Alexander Lempicki, Wayland; Charles Brecher, Lexington, and Herman O. Dressel, Lynnfield, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Oct. 3, 1974, Ser. No. 511,896

Int. Cl.² H01J 29/20

U.S. Cl. 313—468 **9 Claims**



1. A source of white light comprising

a low voltage electron beam source,

a grounded anode plate toward which the low voltage electron beam is directed,

means for controlling the geometry of the low voltage electron beam on the anode, and

a quantity of material having the general formula MP_5O_{14} disposed on and in electrical contact with the anode plate at the intersection of the low voltage beam, where M is a trivalent metallic ion selected from the group consisting of: lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium, yttrium, and mixtures of a plurality thereof, the material thereby emitting light in a broad spectral continuum centered in the visible portion of the electro-magnetic spectrum and exclusive of any emission associated with a transition of the trivalent metallic ion involving electrons of its 4f shell.

4,004,179

SLOW WAVE CIRCUIT HAVING SERIALLY CONNECTED CONTRAWOUND TWO-TURN HELICES

Robert Matthews Phillips, Redwood City, Calif., assignor to Litton Systems, Inc., San Carlos, Calif.

Filed Oct. 20, 1975, Ser. No. 623,718

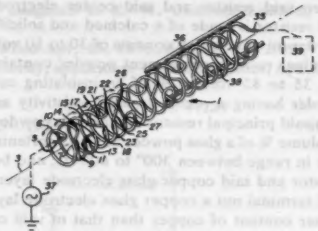
Int. Cl.² H01J 25/34

U.S. Cl. 315—3.5 **20 Claims**

1. In combination with a microwave frequency apparatus, the slow wave structure comprising: an electrically conductive wire formed into a plurality of serially connected helices of two turns each, said helices located along a common axis;

and wherein intermediate ones of said helices extend around about said common axis in a clockwise direction and alternate ones of said helices extend around about

said common axis in a counterclockwise direction to provide a series electrically conductive microwave energy



propagating path that progresses serially through said helices.

4,004,180

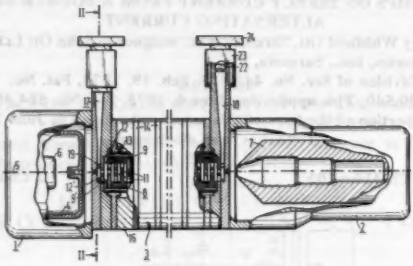
TRAVELING WAVE TUBE WITH RECTANGULAR COUPLING WAVEGUIDES

Franz Gross, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed June 9, 1975, Ser. No. 585,079

Int. Cl.² H01J *25/34*

U.S. Cl. 315—3.5 11 Claims



1. In a traveling wave, particularly high-efficiency traveling field tubes having a magnetic system for the bundled guidance of an electron beam, which system surrounds a delay line comprising line cells arranged one behind the other, separated from one another by transverse walls, each of which is provided with an opening therein for the passage of the electron beam, and a coupling opening therein extending substantially in circumferential direction, with the delay line coupled, at least at one of its frontal sides with a rectangular hollow conductor whose broad side, adjacent the longitudinal axis of the delay line (line axis), extends perpendicular thereto, and which conducts at a right angle with respect to the line axis, the combination of the hollow rectangular conductor, preferably employed in connection with a spatial periodic permanent magnet system (PPM System), without loading, which has the opposite transverse walls of minimum spacing and greatest width tapering in a direction toward the delay line, with the spacing between such walls at the delay line being approximately that between adjacent transverse walls defining the respective cells, the opposite longitudinal side walls of maximum spacing and least width having opposed, inwardly directed projections forming a shield, the transverse wall of said conductor adjacent said delay line having a coupling opening therein whose open angle, with respect to the line axis is larger than the corresponding angle of the coupling openings in the transverse walls of adjacent line cells, and having the following dimensions:

0.1	λ_o	<	a	<	0.15	λ_o
0.07	λ_o	<	b	<	0.12	λ_o
0.22	λ_o	<	c	<	0.3	λ_o
0.04	λ_o	<	d	<	0.07	λ_o
0.22	λ_o	<	e	<	0.3	λ_o
	α	<	α_1	<	1.2	α

in which

a = thickness of the shield projections

b = width of the shield projections

c = the distance between the end wall of the hollow conductor and the remote wall of the shield projections

d = the distance between the shield projections and the coupling opening, the corner points of the arcuate shaped coupling opening remote from the line axis

e = the distance between the line axis and the remote edge of the coupling opening

α_1 = the open angle of the coupling opening at the hollow conductor

α = the open angle of the remaining coupling openings in the cell walls

λ_o = the wavelength and free space corresponding to the mean operational frequency of the traveling field tube.

4,004,181

HYPERFREQUENCY RESONANT SYSTEM FOR ACCELERATING A CHARGED PARTICLE BEAM AND A MICROTON EQUIPPED WITH SUCH A SYSTEM

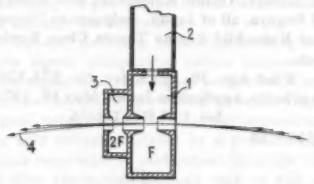
Jacques Kervizic, and Duc Tien Tran, both of Paris, France, assignors to C.G.R.-Mev., Paris, France

Filed May 6, 1975, Ser. No. 574,944

Claims priority, application France, May 10, 1974, 74.16201

Int. Cl.² H01J *25/10*

U.S. Cl. 315—5.41 5 Claims



1. A hyperfrequency resonant system for producing a charged electron beam in a microtron accelerator, said particle beam having substantially circular paths whose radii increase with each transit of said beam through said resonant system, said resonant system which is disposed along said beam comprising at least a plurality of first resonant cavities fixed with respect to each other tuned at a fundamental frequency F and excited at said frequency F by means of an external electromagnetic energy source, said first resonant cavity being disposed along the beam axis associated with a resonant element tuned to the harmonic frequency 2F and disposed along said beam axis and fixed with respect to said first cavities, said resonant element being excited at frequency 2F by means of said beam, the particles of which are bunched after the first passage of said beam through said resonant system.

4,004,182

OPERATION OF STORAGE TUBES HAVING SECONDARY ELECTRON EMISSIVE TARGETS

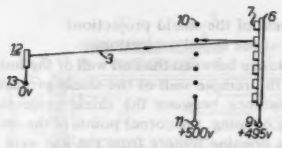
Ralph Desmond Nixon, Braintree, England, assignor to English Electric Valve Company Limited, Chelmsford, England

Filed May 1, 1975, Ser. No. 573,742

Claims priority, application United Kingdom, May 2, 1974, 19229/74

Int. Cl.² H01J 29/41

U.S. Cl. 315—12 R 5 Claims



1. A method of operating an image storage tube in which secondary electrons emitted from a secondary electron emissive target when scanned by a beam of electrons originating from an electron gun are influenced by a potential on a mesh electrode positioned between the target and the electron gun, including the steps of writing information in the form of a charge pattern onto said target by superimposing a voltage representative of said information onto a constant bias voltage applied to said target whilst said target is scanned by an electron beam of constant intensity, the value of the bias voltage with respect to the electron gun potential being such that the target exhibits a secondary electron emission ratio of less than unity, and the steps of erasing the written information, as and when required, by applying a constant bias potential to the target, the value of which is sufficiently positive with respect to the cathode potential of the electron gun as to produce a secondary electron emission ratio of greater than unity when the target is scanned, whilst a constant bias potential is applied to the said mesh electrode.

4,004,183

RESISTOR BUILT-IN SPARK PLUG

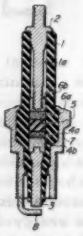
Masami Oki, Nagoya; Masatoshi Suzuki; Yasuo Nakamura, both of Kariya; Osami Kamigaito, and Hideyuki Masaki, both of Nagoya, all of Japan, assignors to Nippondenso Co., Ltd. and Kabushiki Kaisha Toyota Chuo Kenkyusho, both of Japan

Filed Apr. 30, 1975, Ser. No. 573,326

Claims priority, application Japan, May 10, 1974, 49-52710

Int. Cl.² H01T 1/16

U.S. Cl. 315—58 3 Claims



1. A resistor built-in spark plug comprising:

an insulator provided with an axially extending bore;

a terminal nut fitted in the upper end portion of said bore;

a center electrode fitted in the lower end portion of said bore;

a resistor arranged in the central portion of said bore;

copper glass electrode layers respectively interposed between said resistor and said terminal nut, as well as between said resistor and said center electrode, wherein said resistor is made of a calcined and solidified resistor powder mixture which consists of 30 to 10 volume % of a principal resistor component powder containing tin oxide, 35 to 85 volume % of an insulating ceramic filler powder having a relatively high resistivity as compared with said principal resistor component powder, and 35 to 5 volume % of a glass powder having a softening temperature in range between 300° to 600° C; and between said resistor and said copper glass electrode layer contacting said terminal nut a copper glass electrode layer having a higher content of copper than that of said copper glass electrode layer contacting said terminal, and between said resistor and the other said copper glass electrode layer contacting said center electrode a copper glass electrode layer also having a higher content of copper than that of said copper glass electrode layer contacting said center electrode.

4,004,184

APPARATUS FOR OPERATING GASEOUS DISCHARGE LAMPS ON DIRECT CURRENT FROM A SOURCE OF ALTERNATING CURRENT

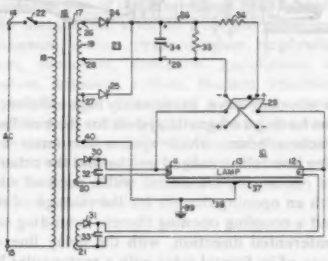
Henry Whitfield Ott, Sarasota, Fla., assignor to John Ott Laboratories, Inc., Sarasota, Fla.

Division of Ser. No. 443,825, Feb. 19, 1974, Pat. No. 3,890,540. This application June 6, 1975, Ser. No. 584,400

The portion of the term of this patent subsequent to June 16, 1992, has been disclaimed.

Int. Cl.² H05B 41/16

U.S. Cl. 315—101 2 Claims



1. Apparatus for operating a gaseous discharge lamp from an AC power source so as to provide flickerless operation of the lamp, said lamp having a pair of electrodes across which a voltage is applied to start and operate the lamp and a filament heater associated with at least one of said electrodes, said apparatus comprising:

a. rectifier means having an input circuit connected to be energized by said AC power source and an output circuit connected to the lamp electrodes for operating the lamp on a DC current flowing between the electrodes,

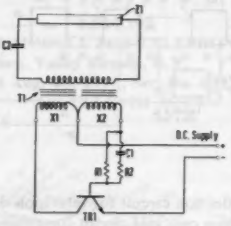
b. a heater circuit adapted to be energized from said AC power source for supplying heater current continuously during operation of the lamp to said heater independently of the current flowing between the lamp electrodes, and

c. additional rectifying means for rectifying the current in the heater circuit whereby DC is supplied to said heater to prevent flicker of said lamp during operation.

4,004,185
ELECTRIC LIGHTING SYSTEMS

Harry Edmondson, and Walter Whittaker, both of Burnley, England, assignors to E. W. Controls Limited, Burnley, England

Filed Apr. 25, 1975, Ser. No. 571,509
Claims priority, application United Kingdom, Apr. 27, 1974, 18558/74
Int. Cl.² H05B *41/29*
U.S. Cl. 315—105 **10 Claims**

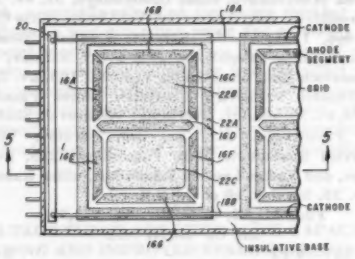


1. A method of lighting a cold cathode electric gas discharge lamp having a length of at least one foot, comprising connecting the lamp across the secondary winding of a voltage step-up transformer, energizing the primary winding of the transformer with a chopped D.C. voltage having a frequency of at least 12 kHz and a voltage which provides an output voltage from the secondary winding of the said transformer having an R.M.S. value no greater than 700 volts.

4,004,186
VACUUM FLUORESCENT DISPLAY HAVING A GRID PLATE COPLANAR WITH THE ANODE

Ernest Gerald Bylander, Sherman, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 1, 1975, Ser. No. 636,471
Int. Cl.² H01J *1/72, 63/06;* H05B *37/02*
U.S. Cl. 315—167 **7 Claims**

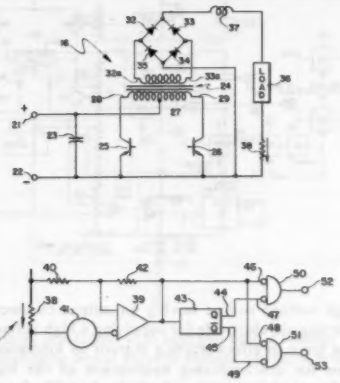


1. A character indicating tube comprising an evacuated envelope having at least one transparent side portion; an insulating base mounted within said envelope; at least one pattern of anode segments mounted on said insulating base for displaying a character, each of said anode segments having a phosphor coating thereon, said phosphor coating facing said transparent side portion; a control electrode insulated from and substantially laterally surrounding said anode segments, said control electrode being substantially coplanar with said anode segments; at least one cathode mounted in said envelope in the space between said transparent side portion and said insulating base, said at least one cathode being disposed such that the distance separating said at least one cathode and said control electrode is less than the distance separating said at least one cathode and any of said anode segments.

4,004,187
PUSH-PULL INVERTER BALLAST FOR ARC DISCHARGE LAMPS

Loren H. Walker, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 516,788, Oct. 24, 1974, abandoned.
This application Feb. 23, 1976, Ser. No. 660,687
Int. Cl.² H05B *37/00*
U.S. Cl. 315—205 **16 Claims**



1. A push-pull ballast for an arc discharge lamp for operation from a power source either higher or lower in voltage than said lamp operating voltage comprising:

push-pull high frequency inverter means adapted to be connected to a source of unfiltered, pulsating d.c. power, said inverter means including a transformer having a center tapped primary winding and a secondary winding, a pair of controllable solid state switching devices, capable of being turned ON and OFF, said devices connected to said primary winding to cause current to flow therein, and rectifier means operatively associated with said secondary winding and a capacitor connected across said source of pulsating d.c. power, having a high impedance at the frequency of said pulsating d.c. power and low impedance at the frequency of said high frequency inverter, providing substantially no filtering at said frequency of said pulsating d.c. power,

means providing a signal proportional to the instantaneous current through the lamp, and

a control circuit, including means generating a variable reference signal, comparator means responsive to said reference signal and said signal proportional to said instantaneous current for providing an output signal when said signal proportional to said instantaneous current exceeds said reference signal by a preselected amount and means responsive to said output signal for controlling current flow alternately through each of said switching devices so that each period of conduction of one of said devices is followed by a period during which neither device is conducting and further for causing each period of conduction to terminate in response to said output signal so that said instantaneous current varies in accordance with said reference signal.

4,004,188
STARTING CIRCUIT FOR INVERTER OPERATED GASEOUS DISCHARGE LAMPS

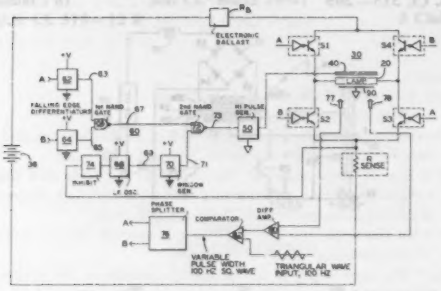
Robert C. Cooper, Fort Wayne, Ind., assignor to General Electric Company, Carmel, Ind.

Filed Sept. 26, 1975, Ser. No. 617,014
Int. Cl.² H05B *41/22*
U.S. Cl. 315—261 **16 Claims**

1. In an electrical circuit having a semiconductor switching

inverter responsive to alternating polarity drive signals for the alternating polarity operation of a gaseous discharge lamp from a DC energy source, a circuit arrangement for starting the lamp while in the inverter circuit, comprising:

a starting aid electrode mounted in close proximity to the lamp for capacitively coupling pulse high voltage to the lamp;



a high voltage source having an output connected to the starting aid electrode for supplying a high voltage pulse to the lamp to effect starting thereof by ionization; and

means for synchronizing application of the high voltage pulse to the starting aid electrode with the turn-on of either polarity of the switching inverter while in the running inverter mode.

4,004,189

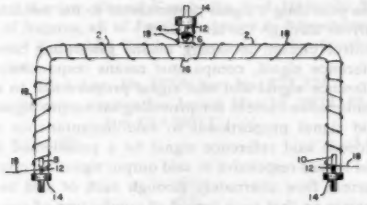
THREE-ELECTRODE SHORT DURATION FLASH TUBE

Robert J. Cosco, Amesbury; John A. Pappas, Winthrop, and Thomas A. Brewin, Hamilton, all of Mass., assignors to GTE Sylvania Incorporated, Salem, Mass.

Continuation of Ser. No. 528,826, Dec. 2, 1974, abandoned. This application June 7, 1976, Ser. No. 693,580

Int. Cl.[2] H01J *61/06, 61/16, 61/30;* **H05B** *41/30*

U.S. Cl. 315—335 **17 Claims**



1. A flash tube comprising:

an elongated, light-transmitting tubular envelope which is hermetically sealed;

a rare gas in said envelope;

a pair of anode electrodes in said envelope, one disposed at each end thereof;

a cathode electrode disposed in said envelope between said anode electrodes, said cathode being common to both of said anodes to thereby provide two discharge paths; and

means for providing external triggering of both of said discharge paths whereby two separate arc discharge paths are simultaneously defined through respective portions of said envelope between the common cathode and respective anodes during operation of said flash tube, whereby a shorter flash duration is provided for a flash tube envelope of given length.

4,004,190

ELECTRICAL AMPLIFIERS

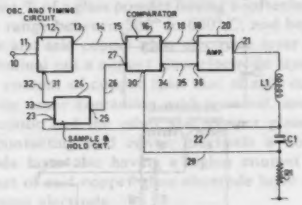
Bryan John Simpson, Selmeston near Polegate, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 7, 1975, Ser. No. 575,127

Claims priority, application United Kingdom, May 13, 1974, 20989/74

Int. Cl.[2] H01J *29/70*

U.S. Cl. 315—403 **9 Claims**



1. A field deflection circuit for television display apparatus having a deflection coil, said circuit comprising main amplifier means having a first input means for receiving a deflection waveform signal, second and third control input means, and an output means for coupling to said deflection coil, a first negative feedback means for feeding a signal proportional to the current through said deflection coil for said second control input of said amplifier, and said second negative feedback means for feeding a signal proportional at a given time to the output voltage of said amplifier to said third control input of said amplifier; said second feedback means comprising means for sampling said voltage at said given time during each cycle of said deflection waveform, and means for producing a feedback signal proportional to said sampled voltage, said feedback signal remaining substantially constant during the remainder of each cycle of said deflection waveform.

4,004,191

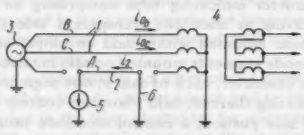
METHOD OF REDUCING CURRENT UNBALANCE IN A THREE-PHASE POWER TRANSMISSION LINE OPERATING WITH ONE FAULTY PHASE

Jury Fedorovich Koroljuk, ulitsa Tankovaya, 67, kv. 77; Lidia Petrovna Scherbakova, ulitsa Uchitelskaya, 32, kv. 3, both of, Novosibirsk; Jury Andreevich Vakulenko, ulitsa Chernyshevskogo, 132a, kv. 55, Saratov; Vladimir Nikolaevich Matrosov, ulitsa Pasadskogo, 276, kv. 3, Saratov; Viktor Demyanovich Rud, ulitsa 20 let VLKSM, 103, kv. 2, Saratov; Timofei Vasilievich Chelyshev, ulitsa Pasadskogo, 272/274, kv. 33, Saratov; Vyacheslav Viktorovich Shabashov, ulitsa Pasadskogo, 215, kv. 209, Saratov; Vladislav Vasilievich Shubnikov, ulitsa Pasadskogo, 215, kv. 167, Saratov, and Vadim Lvovich Schedrikov, ulitsa Rabochaya, 10, kv. 25, Saratov, all of U.S.S.R.

Filed May 2, 1975, Ser. No. 573,996

Int. Cl.[3] H02H *7/22*

U.S. Cl. 317—9 PF **5 Claims**



1. A method for reducing current unbalance in the electric system of a three-phase A.C. power transmission line operating in an incomplete phase regime using the wires of the line and transformers electrically coupled thereto, comprising the following steps:

providing an electric closed loop circuit comprising the line operating in the incomplete phase regime, a wire insu-

lated from ground and disposed parallel to said line along the whole length thereof, and the neutrals of said transformers;

connecting into the provided electric closed loop circuit a source of alternating voltage in phase with the electric system to which said line is connected; and

selecting the corresponding phase and value of voltage of said source to obtain an increase of current flowing through the neutrals of said transformers, resulting in decreased current unbalance in the electric system.

4,004,192

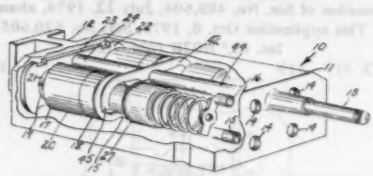
PROTECTOR MODULE FOR TELEPHONE SYSTEMS

William V. Carney, Valley Stream, N.Y.

Filed Aug. 28, 1975, Ser. No. 608,508

Int. Cl.² H02H *3/22*

U.S. Cl. 317—16 **2 Claims**



1. In a telephone line protective module having means for conducting excessive voltage surges through an arcing device to a source of ground potential, and heat-sensitive means for conducting excessive currents to said source of ground potential, said last mentioned means serving to by-pass said arcing device upon activation of said heat-sensitive means, the improvement comprising: said module including a shaft-like plunger, coil spring means urging said plunger in a given direction, external contact means communicating with said plunger and spring for conducting current through said spring and plunger during normal operation; a grounding prong having a principal axis parallel to that of said plunger, a laterally extending grounding plate mounted substantially at one end of said grounding prong; said arcing means being axially aligned with said plunger and positioned to contact a surface of said grounding plate for electrical conduction therethrough, a laterally-extending conductor member mounted medially upon said grounding prong and extending between said arcing means and said plunger, said laterally-extending conductor member normally being free of contact with said plunger; whereby actuation of said heat-sensitive means serves to move said plunger toward said arcing means, and clamp said laterally-extending conductor member therebetween to cause conduction from said plunger to said grounding prong.

4,004,193

VOLTAGE SURGE ARRESTER WITH CAPACITIVE GRADING AND IMPROVED SPARKOVER FOR FAST IMPULSES

Ronald M. Reckard, Pittsfield, Mass., assignor to General Electric Company

Filed Mar. 17, 1975, Ser. No. 558,789

Int. Cl.² H02H *3/22*

U.S. Cl. 317—70 **3 Claims**

1. A voltage surge arrester of the type having:

a plurality of control gap units, having substantially equal sparkover voltages for slow voltage impulses;

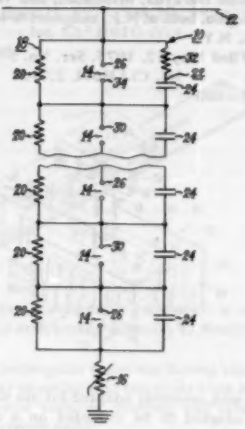
one or more varistor blocks connected in series with said gap units;

a series line of voltage grading resistors connected in parallel with said gap units, and

a series line of grading capacitor connected in parallel across successive individual units of said gap units,

wherein the improvement comprises:

at least one of said gap units also having individually connected in parallel with it, and in series with those of said



capacitors associated with said gap unit, a resistor having a substantially linear current-voltage characteristic.

4,004,194

MODULE FOR SUPPORTING CIRCUIT BOARDS

Karl Doerflinger; Hermann Renner, both of Munich, and Richard Theus, Wolfratshausen, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

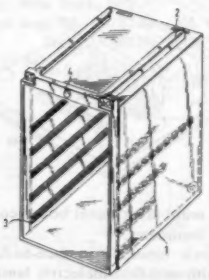
Filed Sept. 23, 1974, Ser. No. 508,639

Claims priority, application Germany, Sept. 27, 1972, 2348687

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² H05K *7/14*

U.S. Cl. 317—100 **5 Claims**



1. A module for supporting printed circuit boards therein comprising:

a top wall, a pair of side walls connected to said top wall, and a bottom wall connected to said side walls;

suspension means fixed to the outside surface of one of said walls for connecting said module into an assembly system;

support means mounted on the inside surface of said side walls for supporting printed circuit boards therein; and

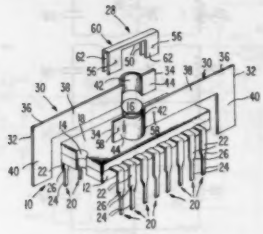
said module comprising an integral one piece unit of synthetic material, said synthetic material being metallized and having graphite incorporated therein.

4,004,195

HEAT-SINK ASSEMBLY FOR HIGH-POWER STUD-MOUNTED SEMICONDUCTOR DEVICE

George Michael Harayda, Middlesex, and Wayne Miller Austin, Flemington, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed May 12, 1975, Ser. No. 576,607
Int. Cl.² H01L *23/40*
U.S. Cl. 317—100 **11 Claims**



1. A heat-sink assembly adapted for use with a semiconductor device adapted to be mounted on a circuit board and having a heat-conductive stud emerging from a surface of said device away from said circuit board comprising

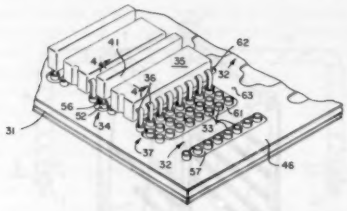
a heat-dispersing arm of heat-conductive material, said arm having one end thereof adapted for secure attachment to said circuit board, the other end thereof being shaped for semipermanent connection and thermal coupling to said stud, said arm being sufficiently bendable to allow displacement thereof from above said surface of said device for removal of said device from said circuit board after disconnecting said other end from said stud while keeping said one end securely attached to said circuit board.

4,004,196

MULTI-LAYER PANEL BOARD WITH SINGLE-IN-LINE PACKAGE FOR HIGH SPEED SWITCHING LOGIC

Leonard A. Doucet, Norton, Mass., assignor to Augat, Inc., Attleboro, Mass.

Filed Apr. 24, 1975, Ser. No. 571,429
Int. Cl.² H05K *5/00*
U.S. Cl. 317—101 CC **13 Claims**



1. An improved multi-layer panel board comprising:

a first dielectric laminate;

a second dielectric laminate in face-to-face confronting relationship with said first dielectric laminate;

a first conductive plane located between said first and second dielectric laminates;

a second conductive plane on the outside of said second dielectric laminate;

a third conductive plane on the outside of said first dielectric laminate;

said panel board being formed with a plurality of dual-in-line arrays of holes therethrough, said arrays being arranged in regular parallel and end-to-end relationship over the surface of said panel board;

a plurality of single-in-line rows of holes adjacent of said dual-in-line arrays;

a socket contact mounted in each of said holes in said dual-in-line arrays of holes and in each of said single-in-line rows of holes, said socket contact having a socket projecting into said panel board from one side thereof and a contact pin extending from the opposite side of said panel board;

means connecting one of said conductive planes to at least one of said socket contacts in each of said single-in-line rows of holes; and

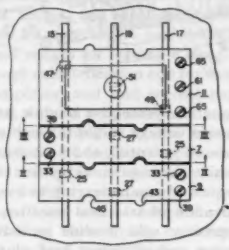
a single-in-line package having a row of electrical leads extending from one edge thereof, one of said leads being received in each of said sockets of said socket contacts in one of said single-in-line rows.

4,004,197

PANELBOARD AND CIRCUIT BREAKER COMBINATION

George F. Hawkes, Jr., La Palma, Calif., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 488,604, July 12, 1974, abandoned. This application Oct. 8, 1975, Ser. No. 620,605
Int. Cl.² H02B *1/04, 1/20*
U.S. Cl. 317—119 **1 Claim**



1. A panelboard and circuit breaker combination comprising a panelboard having a pair of load bus bars and a neutral bus bar between the load bus bars, the load and neutral bus bars being coextensive and extending upright from one side of the panelboard, at least two circuit breakers mounted on the bus bars in side-by-side positions, one of the circuit breakers being releasably connected to the neutral bus bar and one of the load bus bars, the other of the circuit breakers being releasably connected to the neutral bus bar and the other of the load bus bars, each circuit breaker having a housing with a projection and a recess on each side, and the projection and recess of each circuit breaker being mutually interfitting with the corresponding recess and projection of an adjacent circuit breaker when the circuit breakers are properly connected with the bus bars.

4,004,198

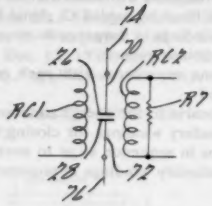
PRIMARY CONTROL SYSTEM FOR FURNACES AND METHOD OF MAKING THE SAME

Anthony C. Cairo, and Ronald E. Holkeboer, both of Holland, Mich., assignors to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 482,072, June 24, 1974, Pat. No. 3,905,748. This application June 18, 1975, Ser. No. 587,821
Int. Cl.² H01H *47/00*
U.S. Cl. 317—155.5 **1 Claim**

1. The method of making a primary control system for furnaces which comprises the steps of providing a pair of resilient magnetic contact members, winding a pair of electrically insulated concentric coils with said coils having a differential in ampere turns, disposing said coils in encompassing relationship with respect to said contact members, measuring the flux generating capacity of at least one of said coils when a predetermined voltage is applied thereto, measuring and severing a length of resistance wire having a predetermined

resistance per unit of length whereby when said severed wire is connected in parallel circuit across said one coil both said coils will have a predetermined flux generating capacity at a



predetermined voltage sufficient to actuate said contact members, and thereafter electrically connecting said severed resistance wire to the opposite ends of said one coil.

4,004,199

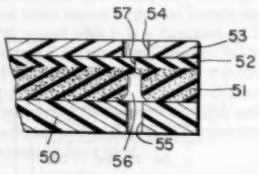
ELECTRICAL COMPONENT SEAL

Godfrey Roy Pearce; Kenneth Drew Beard, and Donald Lloyd Shively, all of Glasgow, Ky., assignors to P. R. Mallory & Co. Inc., Indianapolis, Ind.

Continuation of Ser. No. 369,279, June 12, 1973, which is a continuation of Ser. No. 136,542, April 22, 1971, which is a continuation of Ser. No. 810,972, March 27, 1969. This application May 6, 1975, Ser. No. 575,106

Int. Cl.² H01G 9/00

U.S. Cl. 317—230 **8 Claims**



1. A seal means for closing the open end of means housing an electrical component, the seal means including a polymeric member adjacent the electrical component and having aperture means with spaced apart side walls provided therein, an uncured or incompletely cured elastomeric means adjacent the polymeric member, a cured elastomeric means adjacent the uncured or incompletely cured elastomeric means and having aperture means with abutting side walls capable of separating to open the aperture means and relieve elevated pressure associated with the electrical component and of abutting to close the aperture means when the elevated pressure is relieved and a rigid means adjacent the cured elastomeric means and having aperture means with spaced apart side walls provided therein, the aperture means in the uncured or incompletely cured elastomeric means including a portion having abutting side walls adjacent the aperture means of the cured elastomeric means and a portion having spaced apart side walls adjacent the aperture means of the polymeric member, apertures of the polymeric member and the uncured or incompletely cured elastomeric means and the cured elastomeric means and the rigid means aligned to relieve elevated pressures associated with the electrical component, the polymeric member selected from the group consisting of polyethylene, polypropylene, polybutylene, polystyrene and copolymers thereof.

4,004,200

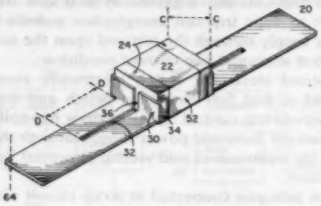
CHIP CAPACITOR WITH SPRING-LIKE LEADS

John E. Johanson, Boonton, N.J., assignor to Johanson Manufacturing Corporation, Boonton, N.J.

Filed July 21, 1975, Ser. No. 597,870

Int. Cl.² H01G 1/14

U.S. Cl. 317—242 **4 Claims**



1. In a solid state electronic component, a ceramic chip capacitor and lead attachment assembly in combination comprising:

a substantially rectangular capacitor having electrode ends;

a metalized layer covering said electrode ends and a portion of the capacitor surfaces abutting and communicating with said electrode ends;

a tinned layer covering said metalized layer upon said electrode ends;

a conductive metallic lead strip being substantially rectangular, for each electrode end;

said metallic lead strip terminating, to interface with said tinned and metalized capacitor, in a clasping tab portion, extending beyond the width of said lead strip, bent in a perpendicular relation to embrace three surfaces of said metalized and tinned capacitor,

said tab portion, substantially encompassing said tinned electrode end, having cooperative, perpendicularly extending armatures abutting two of said metalized capacitor surfaces; and

a mediately positioned longitudinal slot extending from said tab portion to approximately one-half the length of said conductive lead strip to effect and enhance the clasping action of said tabs.

4,004,201

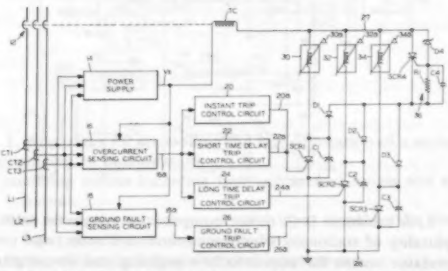
MULTI-FUNCTION SOLID STATE TRIP UNIT WITH TRIP INDICATING MEANS

Robert P. DePuy, Cherry Hill, N.J., assignor to General Electric Company, New York, N.Y.

Filed Aug. 25, 1975, Ser. No. 607,186

Int. Cl.² H02H 7/00

U.S. Cl. 317—33 SC **1 Claim**


POWER SUPPLY
INSTANT TRIP CONTROL CIRCUIT
SHORT TIME DELAY TRIP CONTROL CIRCUIT
LONG TIME DELAY TRIP CONTROL CIRCUIT
GROUND FAULT TRIP CONTROL CIRCUIT
OVERCURRENT SENSING CIRCUIT
GROUND FAULT SENSING CIRCUIT

1. A solid-state trip unit for an electric circuit breaker having circuit interrupting contacts whose separation is initiated by energization of a trip coil, said trip unit including, in combination:

A. a power supply electrically connected to one terminal of the trip coil;

B. means monitoring the line current flowing in an electrical power distribution circuit;

C. a first trip control circuit electrically connected to said current monitoring means and operative in response to a first abnormal line current condition;

D. a second trip control circuit electrically connected to said current monitoring means and operative in response to a second abnormal line current condition;

E. a first electronic switch connected to the other terminal of the trip coil and triggered by said first trip control circuit to draw trip coil energization current from said power supply through the trip coil upon the existence of said first abnormal line current condition;

F. a second electronic switch electrically connected in parallel to said first electronic switch and triggered by said second trip control circuit to draw trip coil energization current from said power supply through the trip coil upon the existence of said second abnormal line current condition;

G. a first indicator connected in series circuit with the trip coil and said first electronic switch and energized by trip coil energization current upon triggering of said first electronic switch to signal the existence of said first abnormal line current condition;

H. a second indicator connected in series with the trip coil and said second electronic switch and energized by said trip coil energization current upon triggering of said second electronic switch to signal the existence of said second abnormal line current condition; and

I. a common bypass circuit including the parallel combination of a third electronic switch and voltage sensing means connected between a first bus common to one side of each said indicator and a second bus separately connected to the other side of each said indicator, whereby, upon the triggering of one of said first and second electronic switches by its associated trip control circuit, said sensing means, operating in response to a voltage exceeding a predetermined threshold as occasioned by the one indicator series connected with said one electronic switch having insufficient electrical continuity to insure adequate energization of the trip coil, triggers said third electronic switch to conduct trip coil energization current around said one indicator to said one electronic switch.

4,004,202

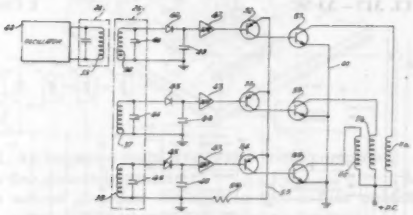
BRUSHLESS D.C. MOTOR

Sidney A. Davis, East Norwich, N.Y., assignor to IMC Magnetics Corporation, Westbury, N.Y.

Filed Jan. 29, 1975, Ser. No. 545,051

Int. Cl.² H02K *29/00*

U.S. Cl. 318—138 **11 Claims**



1. A brushless D.C. motor comprising a magnetic rotor, a plurality of stationary windings around said rotor, and commutator means for sequentially energizing and deenergizing said windings, said commutator means including:

a. a stationary transformer having a primary winding and a plurality of secondary windings, the number of secondary windings being equal to the number of stationary windings, said primary winding being in the form of a printed circuit board, and said secondary windings being in the form of a single printed circuit board spaced from said primary winding board,

b. an oscillator for supplying an A.C. signal to said primary winding,

c. an apertured shield between said primary winding circuit board and said secondary windings circuit board, said shield being rotatable with said rotor for passing said A.C. signal to and blocking said A.C. signal from each of said secondary windings in sequence to energize and deenergize the latter in sequence,

d. switch means associated with each of said stationary windings, and

e. means responsive to the energization and deenergization of said secondary windings for closing and opening said switch means in sequence so as to energize and deenergize said stationary windings in sequence.

4,004,203

DRIVE SYSTEMS USING A.C. MOTORS

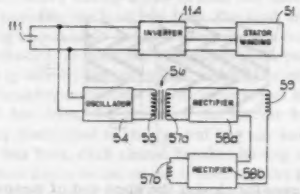
Brian John Chalmers, Bramhall, and John Phillip Gibson, Longsight, both of England, assignors to C.A.V. Limited, Birmingham, England

Filed Dec. 17, 1974, Ser. No. 533,526

Claims priority, application United Kingdom, Dec. 22, 1973, 59678/73

Int. Cl.² H02P *5/34*

U.S. Cl. 318—171 **7 Claims**



1. A drive system comprising in combination: an a.c. synchronous drive motor and an inverter circuit providing power to the motor, said inverter circuit receiving firing pulses under the control of the rotor of the motor, and said inverter circuit being capable of operating from a maximum frequency down to zero frequency, so that the motor operates synchronously from starting up to maximum speed, said motor being a brushless motor having a stator structure including a stator core mounting power windings the flow of current in which is controlled by said inverter circuit, a rotor structure, a field winding on the rotor structure, a rectifier assembly mounted on the rotor for supplying a unidirection current to the field winding, and transformer means including a primary winding and a secondary winding carried by the stator and rotor structures respectively, whereby alternating current can be supplied to said rectifier means, said stator core being provided with slots, a substantial proportion of said slots being occupied by said power windings, the remaining portion of said slots being occupied by the primary winding of said transformer means, said secondary winding comprising a pair of secondary windings electrically positioned 90° apart, said rectifier means comprising a pair of rectifier units supplying unidirectional current to said field winding.

4,004,204

METHOD FOR REGULATING THE MATERIAL SUPPLY TO A PROCESSING MACHINE HAVING AN ELECTRIC DRIVE MOTOR

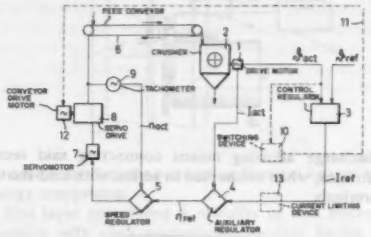
Hans Hoves, Auf der Kicken 17, 5 Cologne 80; Paul Kunath, Nibelungenstrasse 22, 5 Cologne 60, and Herbert Uttelbach, Zu den Dolinen, 56 Wuppertal 2, all of Germany

Filed Dec. 12, 1973, Ser. No. 426,636

Claims priority, application Germany, Dec. 12, 1972, 2260688

Int. Cl.² H02H *5/04*

U.S. Cl. 318—472 **11 Claims**



1. A method of regulating the material feed to a processing machine which is driven by an electric drive motor, comprising the steps of:

sensing the temperature of a drive motor winding;

generating a first signal representative of the temperature sensed;

generating a reference second signal to represent less than the maximum permissible winding temperature;

comparing the first signal with the reference second signal and providing a third signal which is a function of said first and second signals;

sensing actual motor current to provide a fourth signal;

comparing said third signal with said fourth signal and providing a fifth signal which is a function of the third and fourth signals and representing desired material feed;

sensing actual material feed to provide a sixth signal;

comparing said fifth and sixth signals and providing a seventh signal which is a function of the fifth and sixth signal;

and applying said seventh signal to the material feed drive to adjust the material feed rate.

4,004,205

HYBRID SERVO CONTROL SYSTEM

Makoto Yamamoto, Hachioji, and Hironobu Katayama, Sagamihara, both of Japan, assignors to Hitachi Electronics, Ltd. and Nippon Hoso Kyokai, both of Tokyo, Japan

Filed Dec. 6, 1973, Ser. No. 422,486

Int. Cl.² G05B *1/02, 21/02*

U.S. Cl. 318—608 **15 Claims**

1. A hybrid servo control system with an integral control loop comprising:

means for producing a signal which represents the operational phase and frequency of a system to be controlled;

an analog phase comparator means for detecting a phase difference between said signal and a reference signal and producing an analog amount proportional to said detected phase difference;

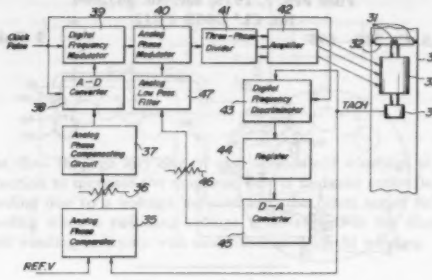
an analog-digital converter means for converting said analog amount supplied from said analog phase comparator means into a digital amount and storing said digital amount;

a clock pulse generator means for producing clock pulses of a given repetition frequency;

a digital frequency modulator means for receiving as input signals both of said digital amount supplied from said analog-digital converter and said clock pules supplied from said clock pulse generator means and having a counter which counts down said clock pulses with a count down ratio depending on said digital amount so as to produce frequency-modulated carrier pulses;

means for forming a driving signal to drive said system to be controlled from said frequency-modulated carrier pulses supplied from said digital frequency modulator;

means for supplying said driving signal to said system to be controlled;



an analog gain adjuster means arranged between said analog phase comparator means and said analog-digital converter means for adjusting the gain of said analog amount; and

an analog phase compensating circuit means arranged between said analog phase comparator means and said analog-digital converter means for compensating the phase characteristic of said analog amount.

4,004,206

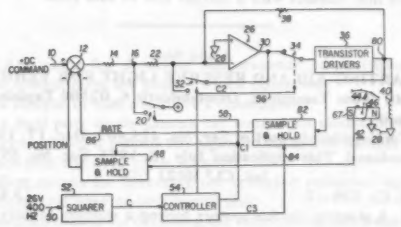
SERVOED INDICATING APPARATUS

Leon T. Gompert, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Division of Ser. No. 415,876, Nov. 15, 1973, Pat. No. 3,934,196. This application June 30, 1975, Ser. No. 591,389

Int. Cl.² G05B *21/02*

U.S. Cl. 318—636 **3 Claims**



1. Apparatus for controlling the rate of rotation of a motor comprising, in combination:

summing means including first and second inputs and an output;

first means for applying a control input signal to the first input of said summing means;

motor means including electrical input means;

second means connected between the output of said summing means and the electrical input means of said motor means for supplying to said motor means a signal indicative of the summation of signals applied to said summing means; and

third means, connected to said summing means and said motor means, for periodically deactivating the application of signals to said motor means, for sampling the back

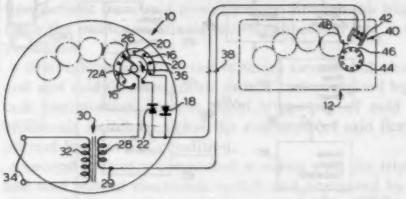
EMF generated by said motor means during each deactivation period after decay of the signals applied to said motor means, and for applying an indication of the sampled signal to the second input of said summing means.

4,004,207

ROTARY SWITCH

Vernon E. Dickson, Toronto, Canada, assignor to Sangamo Electric Company, Springfield, Ill.

Filed Feb. 7, 1975, Ser. No. 547,864
Int. Cl.² G05B 11/12
U.S. Cl. 318—695 **9 Claims**



1. A multiple contact rotary switch comprising a rotatable staff having an electrically conductive, flexible and elongated armature physically and electrically secured thereto for rotation therewith so as to sweep an area surrounding said staff, and a plurality of pins radially spaced from said rotatable staff and positioned near the outer boundary of said swept area so as to be contacted, seriatim, by the outer end of said armature remote from said staff as said staff and armature rotate, the length of said armature being at least equal to the distance from the point where it is attached to said staff to any one of said pins so that the outer end of said armature makes a wiping contact with only one pin at a time, and said outer end of said armature being bifurcated, and having two sections of unequal length with the length of both sections being sufficient to assure contact thereof with any one of said pins, and to permit the shorter section to be moved out of contact with a given pin while said longer section remains in contact with said given pin, the movement of said shorter section out of contact with said given pin causing the longer section to lose contact with said given pin, permitting said outer end of said armature to move into contact with a further one of said pins.

4,004,208

STARTING AID AND RESERVE LIGHT FOR VEHICLES

Pentti Juuse Tamminen, Otsolahdentie 6, 02100 Tapiola, Finland

Continuation-in-part of Ser. No. 425,407, Dec. 17, 1973, abandoned. This application July 18, 1975, Ser. No. 597,046
Int. Cl.² H02J 7/00
U.S. Cl. 320—2 **13 Claims**

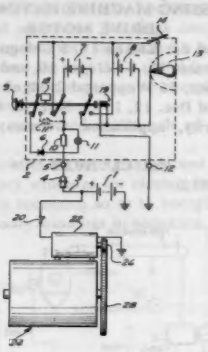
1. A starting aid for motors having a starting battery comprising

a. starting aid terminals connected to corresponding terminals of the starter battery;

b. at least two secondary batteries normally connected in parallel between said starting aid terminals, the positive terminals of said secondary batteries being connected to the positive terminal of the starter battery and the negative terminals of said secondary batteries being connected to the negative terminal of the starter battery, said secondary batteries being sealed, at least partially rechargeable batteries having a current capability substantially smaller than the starter battery;

c. a change-over switch for interrupting the parallel connection of said secondary batteries and connecting said secondary batteries in series between said starting aid terminals;

d. discharge preventing means for preventing said secondary batteries, when connected in parallel, from discharging through said starting aid terminals; and



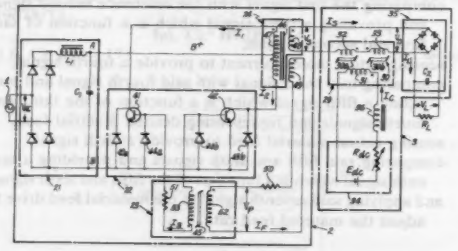
e. discharge allowing means connecting said secondary batteries, when connected in series, with said starting aid terminals.

4,004,209

WIDE RANGE POWER CONVERSION SYSTEM

Harry W. Lawson, Jr., Rush, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 21, 1975, Ser. No. 570,524
Int. Cl.² H02M 7/155
U.S. Cl. 321—2 **11 Claims**



3. A high efficiency power conversion system capable of use with AC line sources having a wide range of line voltage levels and providing a regulated current to a load comprising:

waveform generator means adapted for connection to said AC line source for converting said AC line source into an approximately constant volt-second AC signal having an approximately constant full duty cycle, a variable magnitude corresponding to said AC line voltage, and a variable frequency corresponding to said AC line voltage, but a higher frequency than said AC line source;

current limiting means connected to receive said variable magnitude and variable frequency but approximately constant volt-second and full duty cycle AC signal from said waveform generator means for limiting the current passing through said current limiting means; and

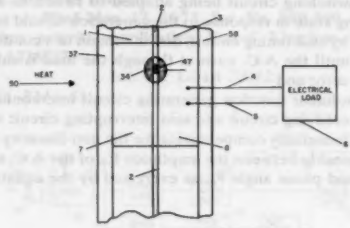
connecting means for connecting said current limiting means between said waveform generator means and a load,

wherein said current limiting means comprises first and second series connected windings, respectively wound on first and second saturable magnetic cores, and current control winding means thereon, to provide a controllable current limiter for controlling the current from said waveform generator means to the load.

4,004,210
REVERSIBLE THERMOELECTRIC CONVERTER WITH POWER CONVERSION OF ENERGY FLUCTUATIONS

Joseph C. Yater, Autumn Lane, Lincoln, Mass. 01773

Filed Sept. 15, 1975, Ser. No. 613,207
Int. Cl.² H01L 37/00, 35/00
U.S. Cl. 322—2 R 31 Claims



1. A device for directly converting thermal energy to electric energy comprising:
   a. a first layer comprising a plurality of first microcircuit modules with each microcircuit module having a first circuit element for converting thermal energy into electric voltage fluctuations;
   b. a second layer contiguous to said first layer comprising a plurality of second microcircuit modules equal in number to said first microcircuit modules, one each of said second microcircuit modules electrically coupled to one each of said first microcircuit modules and one each of said second microcircuit modules having a circuit element for electrically coupling the voltage fluctuations across a thermal barrier; and,
   c. a third layer comprising an equal plural number of third microcircuit modules as said first and second layers, said third layer being contiguous to said second layer, one each of said third microcircuit modules being electrically coupled to one each of said second microcircuit modules, said third layer being also separated from said first layer by said thermal barrier, each of said third microcircuit modules having at least one non-linear circuit for converting the electric voltage fluctuations to D.C. electric power.

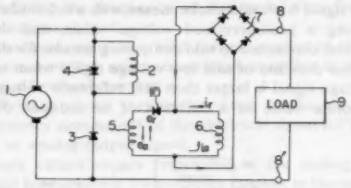
24. A device for directly converting thermal energy to electric energy comprising:
   a. at least one first means for directly converting thermal energy into A.C. electric voltage fluctuations said first means exposed to thermal energy from an external source,
   b. at least one equal number of second means as said first means for converting said electric voltage fluctuations to D.C. electric output power; and,
   c. at least an equal number of third means as each of said first or second means, said third means electrically coupling one each of said first means to one each of said second means, said third means being disposed within a thermal barrier said thermal barrier separating said first and second means.

4,004,211
COMPOUND AC GENERATOR

Masaki Takao, Hitachi, and Hideo Tatsumi, Mito, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Feb. 3, 1976, Ser. No. 654,908
Claims priority, application Japan, Feb. 10, 1975, 50-16227
Int. Cl.² H02P 9/10
U.S. Cl. 322—63 3 Claims

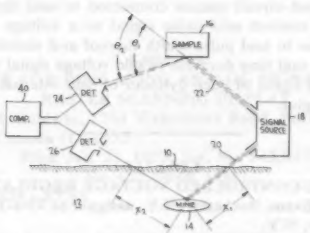
1. In a compound AC generator comprising at least one pair of magnetic poles, series field windings wound on said magnetic poles, respectively, circuit means for connecting said series field windings in parallel to permit a load current of said generator to branch into parallel flowing paths therethrough, and a shunt field winding wound on at least one of said magnetic poles and in layers with the series field winding wound thereon, the improvement which comprises current block means provided in said circuit means so as to block the current flow through any one of said series field windings in a direction to increase the magnetic flux in said one series field winding due to a voltage induced into the other series field winding when a pulsating voltage is developed in the shunt field winding in layers with said other series field winding.



4,004,212
MINE DETECTOR SYSTEM

Donald E. Wortman, Rockville, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 20, 1972, Ser. No. 316,598
Int. Cl.² G01V 3/00
U.S. Cl. 324—3 2 Claims



1. Apparatus for detecting the presence of an explosive whose constituents are known which comprises:
   a. a sample of said explosive's constituents;
   b. a dual port single gamma ray source for simultaneously transmitting a gamma ray signal towards said sample and towards the area to be scanned;
   c. first means for detecting the reflected radiation signals from said area under observation;
   d. second means for detecting the reflected signals from said explosive sample; and
   e. means for comparing the signals detected from said first and second detecting means and for giving an output indication upon the correlation of said signals.

4,004,213
SPARK GAP DETECTOR

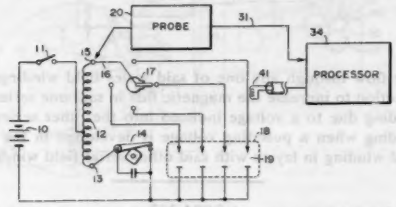
Takayuki Kato, Nishikamo, and Satoshi Yamazaki, Nagoya, both of Japan, assignors to Toyota Jidosha Hanbai Kabushiki Kaisha, Nagoya and Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, both of Japan

Filed Oct. 31, 1974, Ser. No. 519,778
Claims priority, application Japan, Nov. 6, 1973, 48-124641
Int. Cl.² G01M 15/00
U.S. Cl. 324—15 13 Claims

1. An apparatus for measuring a gap between the electrodes

of a spark plug for internal combustion engines, said apparatus comprising

probe means adapted to detect a secondary voltage from an ignition system, comprising a potential divider of resistor means, for supplying of a low-voltage signal, and first circuit means comprising comparing means, connected to said probe means, for comparing a series of said low-voltage signal from said probe means with a reference voltage having a predetermined voltage value, and detecting means, connected to said comparing means, for detecting a time duration of said low-voltage signal when said low-voltage signal is larger than said reference voltage in the absolute value as a duration of an induced discharge



portion included in said secondary voltage, and second circuit means comprising indicating means, connected to said detecting means, for indicating said time duration in readable forms,

said first circuit means generating a pulse signal of rectangular waveform having a pulse width correspond to the length of the spark time of said induced discharge portion, and

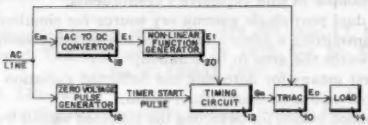
said second circuit means connected to said first circuit means convert said pulse signal to a voltage signal in response to said pulse width thereof and simultaneously display said time duration as said voltage signal with each ignition signal of each cylinder of said internal combustion engine.

4,004,214

PHASE-CONTROLLED VOLTAGE REGULATOR

William C. Evans, Rochester, N.Y., assignor to Viva-Tech, Inc., Rochester, N.Y.

Filed Mar. 28, 1975, Ser. No. 563,156
Int. Cl.² G05F 3/04
U.S. Cl. 323—19 2 Claims



1. An r.m.s. voltage regulating apparatus for maintaining the r.m.s. voltage E_o supplied to a load from an A.C. voltage source of varying amplitude E_m at a substantially constant value, said apparatus comprising:

a. a rectifying circuit coupled to the A.C. voltage source for continuously generating a D.C. signal having an instantaneous amplitude proportional to the instantaneous peak-to-peak amplitude of said source;

b. interrupting circuit means coupled to the voltage source and said rectifying circuit for interrupting the output of the source at the start of each half cycle, the phase angle θ_a of such interruption being proportional to the instantaneous amplitude of said D.C. signal, said interrupting circuit means comprising a pulse generator for generating a first pulse at the start of each half cycle of the A.C. output of the voltage source, a timing circuit which is coupled to said rectifying circuit and said pulse generator for generating a second pulse, a predetermined time after said timing circuit receives a pulse from said pulse generator, the duration of said predetermined time being dependent exclusively upon the instantaneous amplitude of said D.C. signal and controlling the phase angle θ_a of interruption, and a normally non-conducting switching circuit, operatively coupled to said timing circuit output, said switching circuit being adapted to switch to a conducting state in response to the generation of said second pulse by said timing circuit, and to remain in a conducting state until the A.C. current through the load is substantially zero; and

c. A non-linear function generating circuit interconnecting said rectifying circuit and said interrupting circuit means for substantially compensating for the non-linearity in the relationship between the amplitude E_m of the A.C. source and said phase angle θ_a, as expressed by the equation:

$$\frac{E_o}{E_m} = \sqrt{\frac{\pi - \theta_a + \mathrm{Sin}2\theta_a/2}{2\pi}},$$

and for substantially compensating for a non-linearity between the timing circuit input voltage E_i and the phase angle θ_a of interruption, as expressed by the equation:

$$E_i = K(1-e^{-\quad \pi W t})$$

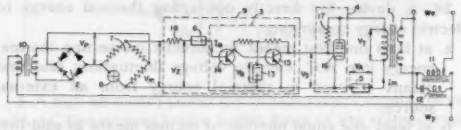
where W is the frequency of the A.C. source and K is a constant.

4,004,215

ALTERNATING CURRENT VOLTAGE REGULATOR INCLUDING SATURABLE INDUCTOR AND MEANS TO BLOCK THE CURRENT FLOW THERETHROUGH

Ludomir Jawniszko, Warsaw, Poland, assignor to Zaklad Aparatury Laboratoryjno-Medycznej Zalmed, Warsaw, Poland

Continuation-in-part of Ser. No. 350,105, April 11, 1973, abandoned. This application Apr. 5, 1974, Ser. No. 458,128
Claims priority, application Poland, Dec. 4, 1972, 154692
Int. Cl.² G05F 1/04
U.S. Cl. 323—56 11 Claims



1. An alternating current voltage regulator comprising

a pair of input terminals to which an alternating voltage is to be applied,

a pair of output terminals to which a load may be connected,

an auto-transformer having a tap,

a transductor having a main winding, a control winding and a saturable core,

means for causing a current to flow through said control winding,

a connection from one input terminal to said tap on said auto-transformer,

a connection from the other input terminal to an end terminal of said auto-transformer by way of said main winding of said transductor,

a connection from one output terminal to the other end terminal of said auto-transformer,

a connection between said other input terminal to said other output terminal,

a source of reference voltage,

means for comparing the voltage across said output terminals with said reference voltage, and

means responsive to said comparison means for interrupting the flow of current through said control winding.

4,004,216
APPARATUS FOR DETECTING METALLIC PARTICLES IN A FLOW OF DIELECTRIC MEDIUM

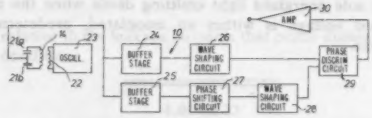
Luc Yves Natens, Berchem, and Jean Martha De Gueldre, Edegem, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Mar. 17, 1975, Ser. No. 559,040

Claims priority, application United Kingdom, Mar. 19, 1974, 12167/74

Int. Cl.² G01R *33/12*

U.S. Cl. 324—41 **12 Claims**



1. An apparatus for detecting the presence of metallic particles within a flowing dielectric medium, comprising a tube through which the dielectric medium is caused to flow, oscillator means oscillating at a given resonant frequency, a parallel resonant circuit excited by the electrical energy emitted by said oscillator means and producing a sinusoidal output signal, said parallel resonant circuit having a self-induction coil arranged around said tube, means for receiving the sinusoidal output signal from said circuit and producing two separate parallel sinusoidal signals, means for shaping said sinusoidal signals into separate square wave signals and for shifting one of said square wave signals 90° out of phase with the other such signal, and discriminator means to which said first and second square wave signals are applied and capable of delivering a constant amplitude output signal having an average value equal to zero when no metallic particle in the flow of said dielectric medium is present and proportionate to the displacement of said square wave signals from said 90° phase difference when a particle is detected in said flow.

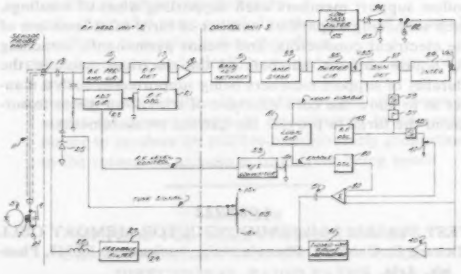
4,004,217
FLUX LOCKED LOOP

Robin P. Giffard, East Palo Alto, Calif., assignor to S.H.E. Corporation, San Diego, Calif.

Filed Oct. 31, 1975, Ser. No. 627,703

Int. Cl.² G01R *33/02*

U.S. Cl. 324—43 R **7 Claims**



1. A flux-locked loop comprising:

a squid defining an aperture through which a time-varying amount of flux is threaded;

error-signal defining means, including the squid, for producing an electrical signal having a modulation frequency component, the magnitude of the modulation frequency component defining the error signal;

the error-signal defining means including

a. biasing means coupled to the squid for causing the error-signal defining means to exhibit a periodic transfer characteristic such that the error signal varies as a periodic function of the average amount of flux threading the aperture during a cycle of the modulation frequency component,

b. modulation circuit means coupled to the squid and defining the frequency of the modulation frequency component, and

c. feedback-signal summing means coupled to the squid for controlling said average amount of flux in response to a feedback current;

feed-forward circuit means responsive to the modulation frequency component of the electrical signal for producing an analog output signal;

feedback circuit means responsive to the analog output signal for supplying the feedback current to the summing means for nulling the error signal; the feedback circuit means including a closed-loop circuit arrangement for producing the feedback current in an amount which is proportional to the analog output signal and which is substantially unaffected by disturbance inputs such as ground-loop noise.

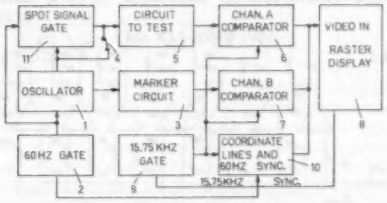
4,004,218
DEVICE FOR DISPLAYING ANALOG SIGNALS ON A RASTER SCANNING DISPLAY

George H. Baldwin, 1764 Waterdown Road, Burlington, Ontario, Canada (L7R3X5)

Filed Jan. 22, 1975, Ser. No. 543,067

Int. Cl.² G01R *27/00*

U.S. Cl. 324—57 SS **8 Claims**



1. Apparatus for displaying a time-varying signal on a raster-scanned display using in combination:

means for creating a ramp signal having an electrical waveform similar to the visual shape of the raster scanlines of said display;

means for synchronizing each cycle of said ramp signal with each succeeding raster scanline;

a member of the unijunction family having two input terminals connected separately to said time-varying signal and said ramp signal;

means to connect suitable voltages to the additional terminals of the unijunction device to make it operate as a unijunction;

means to develop a signal when current flows in the unijunction device;

means to connect the signal developed by the unijunction device to the raster-scanned display.

4,004,219

METHOD FOR MEASURING THE CONDITIONS INSIDE A METAL COVERED FURNACE DURING ITS OPERATION

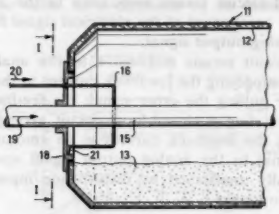
Martti Tiuri, Tapiola, and Tapio Tirkkonen, Helsinki, both of Finland, assignors to Insinooritoimisto Innotec Oy, Suomenoja, Finland

Filed Feb. 21, 1975, Ser. No. 551,851

Claims priority, application Finland, Feb. 22, 1974, 74521; Feb. 3, 1975, 750288

Int. Cl.² G01R 27/04

U.S. Cl. 324—58.5 A **10 Claims**



1. A method for measuring conditions inside a cement kiln or like during its operation, the body of the kiln being comprised of a conductive shell with fire proof lining disposed therein, at one end of the kiln being disposed a transmitting antenna, the protective shell and material inside the kiln being used as a wave guide for radio frequency energy radiating from said antenna, said method including the step of measuring the prevailing field at desired spots along the length of the kiln whereby the impedance of the antenna, attenuation of radiation, the wave length or phase are usable to indicate temperature and other conditions inside the furnace.

4,004,220

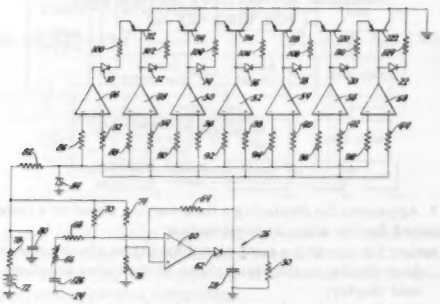
ELECTRONIC VOLTMETER

Marvin Clarence Kerber, and William Steven Traver, both of Colchester, Ill., assignors to Pulse Dynamics Corporation, Colchester, Ill.

Filed July 8, 1975, Ser. No. 594,183

Int. Cl.² G01R 19/16, 13/02

U.S. Cl. 324—103 P **1 Claim**



1. An electronic voltmeter calibrated to develop volume unit output readings for appliance type electronic equipment comprising:

means for developing a reference voltage level;

means for detecting the peak voltage level of a monitored signal;

a plurality of operational amplifiers, each of said operational amplifiers being connected to both said means for developing a reference voltage level and said means for detecting the peak voltage level of a monitored voltage signal, and each of said operational amplifiers being operative to develop a first voltage output when the voltage from said means for detecting the peak voltage level of a monitored voltage signal is greater than the voltage from said means for developing a reference voltage level and a second voltage output when the voltage from said means for detecting the peak voltage level of a monitored voltage signal is less than the voltage from said means for developing a reference voltage level;

a plurality of light emitting diodes respectively connected to the outputs of said plurality of operational amplifiers; and

a plurality of transistors connected with said light emitting diodes for selectively and separately energizing said light emitting diodes in response to the outputs of said operational amplifiers, each of said light emitting diodes being the sole energized light emitting diode when the monitored voltage is within an associated, predetermined range.

4,004,221

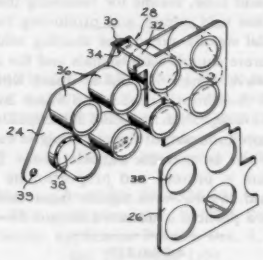
TEST DEVICE AND METHOD OF CHECKING CIRCUITRY

Marvin T. Wilson, Glendale, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Dec. 19, 1974, Ser. No. 534,556

Int. Cl.² G01R 15/00, 15/08

U.S. Cl. 324—158 R **8 Claims**



1. An electrical test device for use in checking current carrying circuitry with an AC current measuring hook-on meter having a magnetic core wherein the test device is permanently installed on an electrical machine having a plurality of electrical conductors supplying a plurality of different electrical loads, said test device comprising: a plurality of hollow support members each supporting a set of windings, each set having a specified number of turns of at least one of the electrical conductors, and means permanently attaching the hollow support members on the electrical machine, the plurality of support members being supported in such a manner as to allow the core structure of a hook-on meter to surround the turns to provide the current measurements.

4,004,222

TEST SYSTEM FOR SEMICONDUCTOR MEMORY CELL

Richard E. Gebhard, Phoenix, Ariz., assignor to SEMI, Phoenix, Ariz.

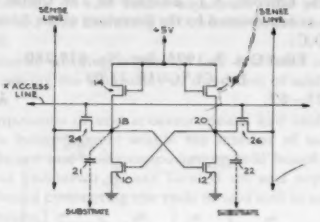
Filed Nov. 20, 1974, Ser. No. 525,381

Int. Cl.² G01R 31/00, 31/26

U.S. Cl. 324—158 R **6 Claims**

1. In a system wherein a semiconductor memory is tested by writing a test pattern therein, and thereafter reading out the test pattern to determine the ability of the memory to store data, a method of substantially shortening the interval required between writing and reading the test pattern without reducing the accuracy of the test, comprising

during a test, substantially increasing the leakage currents of the stray capacitances of the cells of said memory



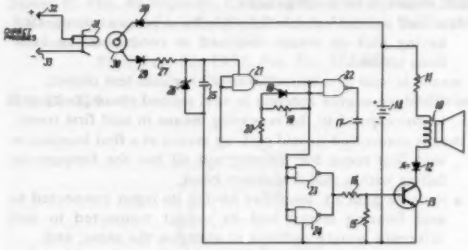
relative to the leakage currents that occur during ambient conditions.

4,004,223

AUDIBLE RESISTANCE OR VOLTAGE TESTER

Samuel G. Cohen, 1215 Bedford Road, Pleasantville, N.Y. 10570

Filed June 16, 1975, Ser. No. 587,154
Int. Cl.² G01R 27/00
U.S. Cl. 324—62 **9 Claims**



1. An audible testing device for testing the current, voltage or resistance of a circuit over a wide range comprising:

a power supply,

first and second input leads for connection to the circuit being tested, said first lead being coupled to the power supply,

a relaxation oscillator connected to the second input lead for filtering power therethrough,

an astable oscillator coupled to the output of the relaxation oscillator and activated thereby,

a pair of parallel gates coupled to the output of the astable oscillator to receive pulses therefrom,

switching means periodically activated by the output of the gates, and,

a speaker in series with said switching means and connected across the power supply to be activated by the switch pulses to produce an audible tone inversely proportional to the resistance or voltage or current being tested.

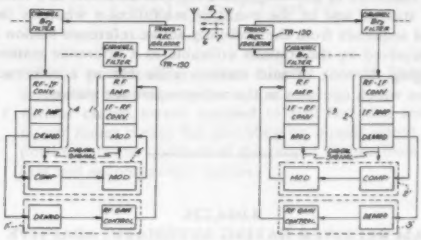
4,004,224

METHOD FOR FADE CORRECTION OF COMMUNICATION TRANSMISSION OVER DIRECTIONAL RADIO PATHS

Walter Arens, and Wolfgang Noack, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Continuation-in-part of Ser. No. 218,163, Jan. 17, 1972, abandoned. This application Sept. 13, 1973, Ser. No. 396,854
Int. Cl.² H04B 7/18
U.S. Cl. 325—2 **8 Claims**

1. A method for fade correction in a directional radio network, utilizing common-channel transmission of digital signals, for example pulse code-modulated signals, and having at least one network junction point at which several radio relay systems from diverging transmission directions meet, each of which systems utilize two-way transmission, and thus includes a transmitter and a receiver for each transmission direction, comprising the steps of so adjusting the transmission operation of the transmitters, of such systems, located at such network junction point, during fade-free conditions, that the transmission power in the respective transmission directions is relatively low, with the useful signal level being approximately 10



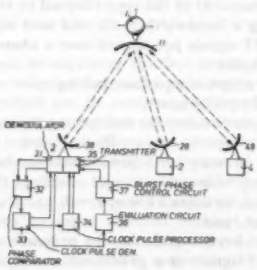
to 20 db greater than the common channel interference, referred to a receiver input at which the signal involved is received, monitoring the reception of the respective transmissions, and when a transmission from one of the transmitters at said junction point, in any respective transmission direction therefrom, is received with fading, adjusting the transmission power, of the transmitter transmitting the fading signal, to a relatively higher level, and thereafter correspondingly decreasing the transmission power thereof upon cessation of such fading.

4,004,225

METHOD FOR SYNCHRONIZING THE PULSE FRAMES IN TIME MULTIPLEX DATA TRANSMISSION VIA COMMUNICATION SATELLITES

Horst Gänssmantel, Backnang, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed May 20, 1975, Ser. No. 579,254
Claims priority, application Germany, May 21, 1974, 2424674
Int. Cl.² H04B 7/26
U.S. Cl. 325—4 **2 Claims**



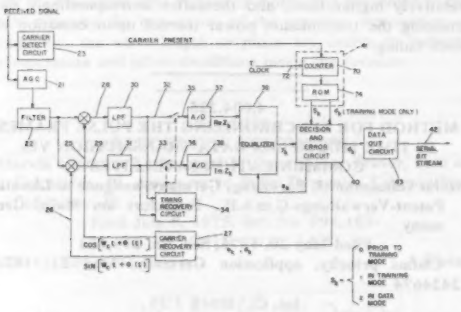
1. A method for synchronizing the pulse frames occurring during the transmission of time multiplex pulse coded data between the stations of a multi-station communication system via the transponder of a communications satellite in which each pulse frame includes a code sequence (SRUW) periodically transmitted by one of the stations which functions as a reference station and pulse bursts transmitted in a prescribed sequence by the other stations of the system, and wherein a

plurality of the stations of the system, which plurality is less than the total number of stations of said system, are utilizable as active reference stations with only one station of said system being an active reference station at any time, comprising: causing all of said stations utilizable as reference stations to periodically transmit their own code sequences (SRUW) at the beginning of successive pulse frames; synchronizing the coded sequence from each of said stations utilizable as reference stations with the coded sequence of the presently active reference station; synchronizing the time of transmission of the pulse bursts of the other stations of said system with the code sequence of any one of said stations utilizable as a reference station; and in the event of malfunction whereby the coded sequence from the presently active reference station is not received by the stations utilizable as a reference station, changing the one of said stations utilizable as a reference station which operates as the active reference station.

4,004,226
QAM RECEIVER HAVING AUTOMATIC ADAPTIVE EQUALIZER

Shahid U. H. Qureshi, Newton, and George D. Forney, Jr., Cambridge, both of Mass., assignors to Codex Corporation, Newton, Mass.

Filed July 23, 1975, Ser. No. 598,252
Int. Cl.² H04B *3/04*
U.S. Cl. 325—42 **11 Claims**



1. In a QAM receiver of the type adapted to receive bursts of signals having a bandwidth B Hz and sent at a predetermined rate of 1/T signals per second over a channel, wherein the receiver includes

an automatic adaptive equalizer having

taps spaced equally apart,

tap coefficient circuitry for multiplying the output of each tap by a respective tap coefficient, and

adjustment circuitry for adjusting said tap coefficients,

output circuitry responsive to said equalizer for providing output signals at times $kT + \tau$, $k = 0, 1, \ldots$, where τ is a timing epoch, and

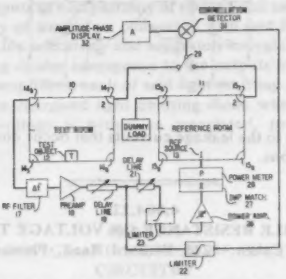
detection circuitry for detecting the presence of an incoming burst of signals at a predetermined position in said receiver,

that improvement wherein said taps are spaced apart by T/n seconds, where n is greater than TB, and control circuitry is provided for early actuation of said adjustment circuitry at a predetermined time dependent upon the time of said detection, to begin adjustment of said tap coefficients and hence training of said equalizer regardless of the initial value of said timing epoch, whereby the data capacity of said receiver is increased by reduction of the time required for set up of said receiver.

4,004,227
RADIO FREQUENCY INTERFERENCE (RFI) TESTING BY THE DUAL SCREEN ROOM TECHNIQUE

Kurt Ikrath, Elberon, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 3, 1975, Ser. No. 619,280
Int. Cl.² G01R *31/02*
U.S. Cl. 325—67 **11 Claims**



5. Apparatus for measuring the intensity of the radio frequency interference generated over a given frequency band by a test object, which comprises:

first and second substantially identical screen rooms each having pick-up means disposed at corresponding locations therein;

means in said first room for receiving said test object;

a reference source antenna in said second room positioned to correspond to the receiving means in said first room;

means connected to said pick-up means at a first location in said first room for filtering out all but the frequencies falling within said frequency band;

a variable gain r.f. amplifier having its input connected to said filtering means and its output connected to said reference source antenna to energize the same; and

means connected to said pick-up means at a second location in said first screen room and a corresponding location in said second screen room for comparing the r.f. field generated by said test object with the r.f. field generated by said reference antenna.

4,004,228
PORTABLE TRANSMITTER

Charles E. Mullett, Los Angeles, Calif., assignor to Integrated Electronics, Ltd., Hong Kong

Filed Apr. 29, 1974, Ser. No. 465,335
Int. Cl.² H04B *1/034*
U.S. Cl. 325—113 **3 Claims**

1. A portable transmitter intended to be used to broadcast a signal when actuated, said transmitter having an actuation means for use in causing the operation of said transmitter, an oscillator means for generating an RF signal in response to the actuation of said actuation means, and an antenna for radiating a signal generated by said oscillator means, in which the improvement comprises:

said transmitter including a flat, electrically non-conductive board,

said antenna consisting of a single electrically conductive coil located on said board adjacent to the periphery of said board and extending around the center area of said board,

said antenna forming a part of said oscillator means and determining the frequency of operation of said oscillator means,

the components of said actuator means and said oscillator means being located within the interior of said coil on said board and being supported on said board,

electrical conductor means located on and supported by said board connecting the ends of said coil to said oscillator means,

said components serving as capacitances adjacent to said antenna and within the interior of said antenna which minimizes the effect of any capacitance adjacent to the exterior of said transmitter in any location where said transmitter may be located so that said antenna will radiate effectively,

said capacitances within said coil also serving to minimize the effect of any stray capacitances on the frequency of operation of said oscillator means.

4,004,229

EAR ATTACHABLE MINIATURIZED RADIO RECEIVER

James R. File, El Segundo, Calif., assignor to James R. File; Henry Slate and Jack Takiff, all of Los Angeles, Calif., part interest to each

Filed Feb. 25, 1975, Ser. No. 552,858

Int. Cl.² H04B *1/08*

U.S. Cl. 325—361 **10 Claims**

1. Apparatus comprising:

a small button adapted to fit in the ear cavity;

a hook for attaching the botton to the ear; and

an AM radio receiver housed in the button, the radio receiver comprising

an antenna tuned to intercept a radio signal in the AM frequency band, the antenna having a coil wrapped around and insulated core made of barium ferrite and a capacitor connected in parallel with the coil,

means for producing an audio signal from the radio signal intercepted by the antenna,

means for converting the audio signal to sound waves, and

a battery to provide power for the radio receiver.

4,004,230

CRITICAL PARAMETER RECEIVER TESTER

Kenneth J. Campbell, Solana Beach, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 29, 1975, Ser. No. 644,410

Int. Cl.² H04B *17/00*

U.S. Cl. 325—363 **6 Claims**

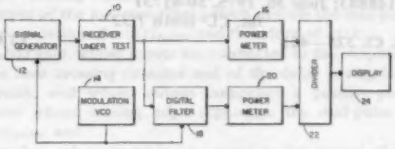
2. A system for measuring critical parameters of a receiver comprising:

a. signal generator means for generating a test signal,

b. a receiver to be tested having its input coupled to said signal generator for receiving the test signal,

c. a first power meter coupled to the output of said receiver for measuring the output power,

d. filter means tuned to the frequency of said test signal coupled to the output of said receiver for allowing only signals to which it is tuned to pass,



e. second power meter means coupled to said filter for measuring the output power,

f. divider circuit means coupled to said first and second power meter means for providing an output signal proportional to the quotient of the output signals from said first and second power meters.

4,004,231

AFC CIRCUIT

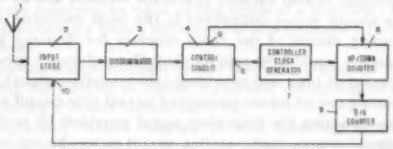
Karl Elshuber, and Laszlo Gotz, both of Freising, Germany, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed May 21, 1975, Ser. No. 579,653

Claims priority, application Germany, May 21, 1974, 2424613

Int. Cl.² H04B *1/16*

U.S. Cl. 325—420 **12 Claims**

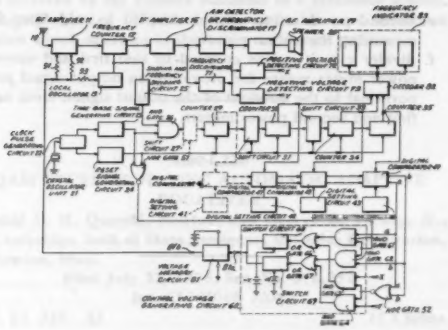


1. A circuit arrangement for fine tuning a broadcast receiver to an assigned frequency, said receiver including an input stage which can be continuously tuned over a desired frequency range by a variable control voltage fed to a control input of said input stage; said tuning circuit including discriminator means for connection to the output of said input stage and adapted to produce an output signal level varying with the difference between the received frequency and said assigned frequency and having a selected nominal value when said input stage is tuned to a particular assigned transmission frequency; clock generator means responsive to a control signal determined by said discriminator means output signal for generating an output signal having a frequency that varies constantly in dependence on variations of said discriminator output signal from said nominal value; up/down counter means actuated by the output signal of said clock generator means and having a predetermined count when the discriminator output signal has that said nominal value; and digital-/analog converter means for converting the count of the counter into a corresponding analog tuning voltage for connection to said control input of said input stage.

4,004,232
RADIO RECEIVER TUNING CONTROL SYSTEM

Yuji Amaya, Kobe, Japan, assignor to Fujitsu Ten Ltd., Kobe, Japan

Filed Dec. 23, 1975, Ser. No. 643,641
Claims priority, application Japan, Dec. 27, 1974, 49-148883; June 30, 1975, 50-81731
Int. Cl.² H04B 1/32
U.S. Cl. 325—421 12 Claims



1. A tuning control system for a radio receiver having a tuning circuit including a variable reactance element as the turning element and a local oscillator, said tuning control system comprising

voltage circuit means for controlling the reactance of the variable reactance element of the tuning circuit of a radio receiver, said voltage circuit means having an output coupled to said variable reactance element and an input;

gate circuit means connected to the local oscillator of the tuning circuit of the radio receiver for deriving a frequency signal from said local oscillator during a specified period of time and providing said frequency signal;

counting circuit means connected to said gate circuit means for counting the frequency signal provided by said gate circuit means, said counting circuit means having output means;

digital setting circuit means for designating a preset frequency of a desired station, said digital setting circuit means having output means;

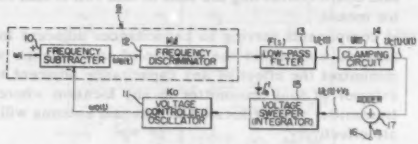
digital comparator means having input means connected to the output means of the counting circuit means and the digital setting circuit means for comparing signals in the output means of said counting circuit means and said digital setting circuit means and providing output signals indicating coincidence and non-coincidence of the signals compared thereby, said digital comparator means having output means; and

control voltage generating circuit means having input means connected to the output means of the digital comparator means and an output connected to the input of the voltage circuit means for detecting coincidence and non-coincidence indications in the output signals of said comparator means and for controlling the supply of a sweep signal to said voltage circuit means, whereby said radio receiver is automatically tuned to the desired frequency.

4,004,233
SEARCH TYPE TUNING DEVICE

Yoichi Sakamoto, Takatsuki, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan

Filed Mar. 14, 1975, Ser. No. 558,550
Claims priority, application Japan, Mar. 22, 1974, 49-32858; Mar. 22, 1974, 49-32859; July 9, 1974, 49-79572; July 9, 1974, 49-79573; July 9, 1974, 49-79574; July 9, 1974, 49-79575; July 9, 1974, 49-79576; July 9, 1974, 49-79577; July 9, 1974, 49-79578
Int. Cl.² H04B 1/32
U.S. Cl. 325—470 12 Claims



1. A search type tuning device comprising

a. a voltage-controlled type oscillator stage (11) whose oscillation frequency is controlled in response to a sweep voltage applied thereto;

b. means for providing an input frequency, a frequency discriminator stage means (9) for subtracting the oscillation frequency of said oscillator (11) and said input frequency and for producing an output voltage corresponding to said difference;

c. a low-pass filter (13) connected to said frequency discriminator stage means for smoothing the output of said frequency discriminator stage means (9);

d. a sweep driving voltage source (16) providing a predetermined output voltage;

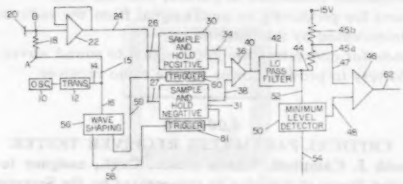
e. an adder (17), operationally connected to said sweep driving voltage both during and after the sweeping operation for linearly adding the output from said low-pass filter (13) and the output voltage from said sweep driving voltage source (16) both during and after the sweeping operation; and

f. an integrator 15 for integrating the output from said adder (17) and for applying the integrated output to said oscillator (11), said integrated output serving as a sweep voltage for controling its oscillation frequency.

4,004,234
ARTICLE PRESENCE SENSOR

John W. Juvinall, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed June 23, 1975, Ser. No. 589,633
Int. Cl.² G08B 27/00
U.S. Cl. 328—5 7 Claims



1. Apparatus for sensing the presence of an article which comprises, in combination:

a source of alternating current;

a high impedance resistor of at least 100 megohms value having one side thereof connected to said source of alternating current;

a metallic sensing element connected to the other side of said resistor;

a voltage follower circuit, connected to the same side of said resistor as said sensing element, for amplifying any signal generated as a result of an article being present before said sensing element;

electronic circuit means, connected to the output of said voltage follower circuit, for furnishing an output signal quantity representative of the total range of the signal from said voltage follower circuit;

said electronic circuit means including

first electronic means for sampling and holding the positive going peak of any electrical signal from said voltage follower;

second electronic means for sampling and holding the negative going peak of any electrical signal from said voltage follower; and

electronic difference means, connected to the output of both said first and second electronic means for sampling and holding, for generating an output signal quantity indicative of the peak to peak output value of said voltage follower;

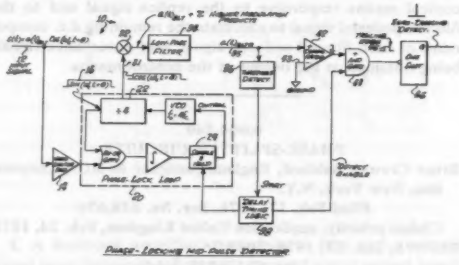
electronic minimum level detection means connected to said electronic circuit means for detecting and holding the minimum value presented by said electronic circuit means during a pre-selected time period; and

electronic comparison means, connected to said minimum level detection means and to said electronic circuit means, for generating an output signal indicative of the presence of an article in response to said output signal from said electronic circuit means exceeding said minimum value by a pre-selected amount.

4,004,235
PHASE-LOCKING MIDPULSE DETECTOR

James L. Roberts, Seattle, Wash., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 1, 1976, Ser. No. 662,659
Int. Cl.² H03B 3/04
U.S. Cl. 328—110 **1 Claim**



PHASE-LOCKING MID-PULSE DETECTOR

1. Apparatus, in a receiver, for detecting the mid-pulse phase reversal of an input signal $s(t) = a(t)_{BLT} \cos(\omega_c t + \theta)$, where the signal $a(t)_{BLT}$ is a modulating signal $a(t)$ after band-limiting by a transmitter and cos $(\omega_c t + \theta)$ relates to a carrier having a frequency f_c and arbitrary phase angle θ, comprising:

a hard-limiter and amplifier whose input is connected to the input signal $s(t)$;

a phase-lock loop circuit, connected to and one of whose two inputs is the output of the hard limiter, and whose output is the signal cos $(\omega_c t + \theta)$ hard limited:

a multiplier circuit, whose two inputs are connected to the input signal $s(t)$ and the output of the phase-lock loop, the output of the multiplier comprising the signal $a(t)_{BLT}$ plus the sum of higher modulation products,

a low-pass filter, whose input is connected to the output of the multiplier and whose output is $a(t)_{BLTR}$, which is the signal $a(t)$ as modified by the band limiting effects of the transmitter and receiver, the higher modulation products being filtered out by the low-pass filter;

a comparator, serving the function of a threshold detector, whose input is connected to the output of the low-pass filter, which senses the presence of a received pulse;

a delay timing logic circuit, whose input is connected to the output of the threshold detector, and one of whose outputs is connected, and forms the second input, to the phase-lock loop for delaying its output signal to the phase-lock loop circuit;

a zero crossing detector, whose input is connected to the output of the low-pass filter, which detects the mid-pulse zero crossing of a $a(t)_{BLTR}$, and therefore of $a(t)$;

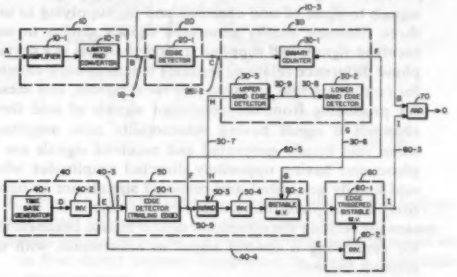
an AND gate, whose inputs are connected to the outputs of the zero crossing detector and of the delay timing logic circuit, and whose output comprises a positive-going pulse whose trailing edge represents the mid-pulse of $a(t)_{BLTR}$; and

a one-shot, whose input is connected to the output of the AND gate, and whose output is a sharp pulse representing the mid-pulse of $a(t)$.

4,004,236
PROGRAMMABLE BANDPASS DIGITAL FILTER OF ANALOG SIGNAL

Carlos D. Cardon, and Lawrence P. Griffone, both of Salt Lake City, Utah, assignors to Sperry Rand Corporation, New York, N.Y.

Filed July 29, 1975, Ser. No. 600,170
Int. Cl.² H03K 9/06
U.S. Cl. 328—138 **10 Claims**



1. A programmable bandpass digital filter of an analog signal, comprising:

means receiving an input analog signal of a frequency F_A for generating a binary digital signal of a frequency F_A therefrom;

counting means coupled to said receiving means for counting the number of cycles N_A of said binary digital signal during a preset sample time T_S;

comparator means coupled to said counting means for determining when said number of pulses N_A is equal to a preset low N_L number of pulses and for determining when said number of pulses N_A is equal to a preset high N_H number of pulses;

programming means coupled to said comparator means for setting in said comparator means said preset low N_L number of pulses and said preset high N_H number of pulses and defining a preset bandwidth;

first memory means responsively coupled to said comparator means for generating as the alternative output signals, an output True signal or an output False signal indicating that said counting means has counted a number of pulses N_A of said binary digital signal that is within or without, respectively, said preset bandwidth;

first gating means;

means coupling said binary digital signal as a first input to said first gating means;

means coupling said first memory means to said first gating means for alternatively coupling said True output signal or said False output signal as a second input to said first gating means, said True output signal or said False output signal enabling or disabling said first gating means to provide or not to provide, respectively, as an output signal therefrom said binary digital signal.

4,004,237

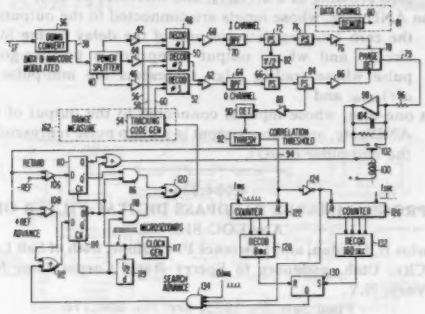
SYSTEM FOR COMMUNICATION AND NAVIGATION

Dale L. Kratzer, Meford Lakes, N.J., assignor to Harris Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 33,748, May 1, 1970, Pat. No. 3,755,816. This application Aug. 20, 1973, Ser. No. 389,796

Int. Cl.² H04B *1/12*; H03B *3/04*

U.S. Cl. 328—155 **7 Claims**



1. Signal correlating apparatus comprising:

a plurality of signal channels, means for supplying received signals to three of said channels and for supplying to said three channels locally generated signals similar to said received signals and supplied to said channels in a certain phase difference relation, separate means in each channel for combining said received and local signals, and means for producing from the combined signals of said three channels a signal having substantially zero amplitude when said locally generated and received signals are in phase and having oppositely directed amplitudes when said locally generated and received signals are in oppositely out-of-phase directions respectively;

means for relating the combined signals in said channels and for generating a control signal in accordance with the relation thereof;

and means responsive to said control signal for modifying the phase of the local signals supplied to said channels.

4,004,238

METHOD AND APPARATUS FOR THE REMOVAL OF RINGING PHENOMENA FROM SIGNAL IMPULSES

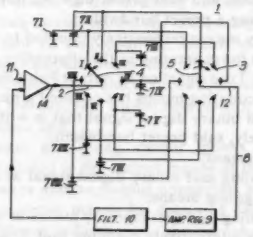
Günter Wichmann, Leimen, Germany, assignor to Eltro GmbH Gesellschaft fur Strahlungstechnik, Heidelberg, Germany

Filed Oct. 31, 1975, Ser. No. 627,917

Claims priority, application Germany, Dec. 14, 1974, 2459242

Int. Cl.² H03B *1/04*

U.S. Cl. 328—165 **9 Claims**



1. A method for the removal of ringing phenomena from a signal impulse in a wide-band spectrum, said method comprising storing amounts of energy or voltage corresponding to amplitude variations of the signal impulse, interrogating said amounts in a delayed manner, and subsequently feeding back the interrogated amounts to the signal impulse for regenerating said signal impulse after having become deformed by decaying transients.

4,004,239

DISCRIMINATION CIRCUIT FOR ISOLATING DISTURBANCE SIGNALS WHICH ARE SUPERIMPOSED ON D.C. PEDESTALS

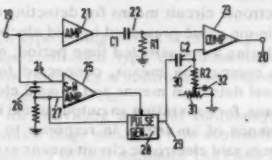
Graham Morley Clarke, Edinburgh, Scotland, assignor to Ferranti, Limited, Hollinwood, England

Filed July 18, 1975, Ser. No. 597,145

Claims priority, application United Kingdom, July 20, 1974, 32270/74

Int. Cl.² H03K *9/02*

U.S. Cl. 329—109 **10 Claims**



1. A discrimination circuit arrangement comprising an input terminal arranged to receive an input signal in the form of d.c. pedestal signals on which disturbance signals may be superimposed, input signal filter means operable to remove the d.c. components of each pedestal signal except immediately adjacent to the leading edge thereof, signal generating means responsive to the leading edge of such pedestal signal to generate a replica signal having the amplitude and shape of the remaining d.c. components of the filtered pedestal signal, and control means responsive to the replica signal and to the filtered pedestal signal to eliminate the remaining d.c. components of each filtered pedestal signal, said disturbance signals being obtained at the output of the control means.

4,004,240

PHASE-SPLITTER CIRCUITS

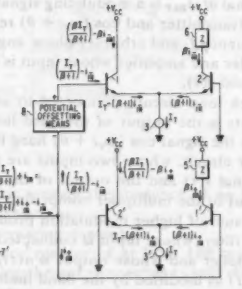
Brian Crowle, Ashford, England, assignor to RCA Corporation, New York, N.Y.

Filed Feb. 17, 1976, Ser. No. 658,676

Claims priority, application United Kingdom, Feb. 24, 1975, 7657/75; Jan. 27, 1976, 3063/76

Int. Cl.² H03F *3/04*

U.S. Cl. 330—14 **12 Claims**



12. In combination:

first and second terminals for receiving an operating potential therebetween;

first and second transistors of the same conductivity type, each having base and emitter and collector electrodes and exhibiting a gain substantially equal to β between its base and collector electrodes, the base elctrode of said second transistor being connected to said first terminal;

output signal current utilization means having a current conductive path therethrough;

first current generator means for causing a predetermined current flow I_T between said first terminal and an interconnection of the emitter electrodes of said first and said second transistors, which current flow is independent of the potential appearing between said first terminal and said interconnection of the emitter electrodes of said first and said second transistors;

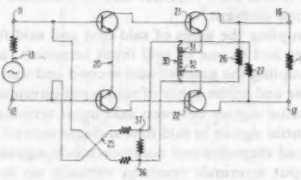
connections of said second terminal to the collector electrodes of said first and said second transistors, one of which connections is through the current conductive path through said output signal utilization means; and

second current generator means for impressing from a relatively high source impedance an input current comprising at least a signal current component between the base electrodes of said first and said second transistors, whereby responsive to said signal current component of said input signal an output signal current β times as large flows in the current conductive path through said output signal utilization means.

4,004,241
HYBRID FEEDBACK AMPLIFIER OF A PUSH-PULL TYPE

Susumu Akiyama, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Filed July 23, 1975, Ser. No. 598,470
Claims priority, application Japan, July 25, 1974, 49-85312
Int. Cl.² H03F 3/26, 1/34
U.S. Cl. 330—15 27 Claims

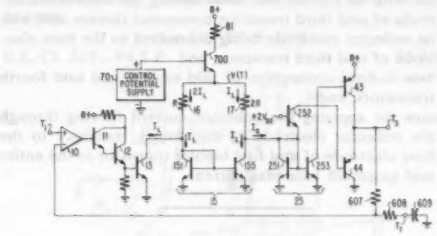


1. A feedback amplifier comprising a first and a second signal input terminal; a first and a second signal output terminal; a first and a second amplifier section of substantially same characteristics, each amplifier section having a first, a second, and a common terminal; a feedback circuit; a first terminating impedance having two ends, one end being connected to said feedback circuit at a first point of connection, the other end being connected to said first amplifier section second terminal; a second terminating impedance having two ends, one end of said second terminating impedance being connected to said feedback circuit at a second point of connection, the other end of said second terminating impedance being connected to said second amplifier section second terminal, said second terminating impedance being substantially equal to said first terminating impedance; first means connecting said first amplifier section common terminal to said second point of connection; second means connecting said second amplifier section common terminal to said first point of connection; third means connecting one of said first signal input and output terminals to said first amplifier section first terminal and to said feedback circuit; fourth means connecting a corresponding one of said second signal input and output terminals to said second amplifier section first terminal and to said feedback circuit; fifth means connecting the other of said first input and output terminals to said first amplifier section second terminal; and sixth means connecting the other of said second signal input and output terminals to said second amplifier section second terminal; said feedback circuit feeding a fraction of signals delivered from said first and second signal input terminals to said first and second signal output terminals through said amplifier sections back to said first and second signal input terminals with reversed polarity; said second, fourth, and sixth means having substantially same characteristics as said first, third, and fifth means, respectively.

4,004,242
APPARATUS FOR SUPPLYING SYMMETRICALLY LIMITED BIDIRECTIONAL SIGNAL CURRENTS

Carl Franklin Wheatley, Jr., Somerset, N.J., assignor to RCA Corporation, New York, N.Y.

Division of Ser. No. 363,600, May 24, 1973, abandoned. This application Feb. 27, 1975, Ser. No. 553,635
Int. Cl.² H03F 3/45
U.S. Cl. 330—22 12 Claims



1. Apparatus for providing a symmetrically limited bidirectional signal current, said apparatus comprising:

means for supplying an a-c signal current superimposed on a first direct current component to form a composite signal current;

means for providing a proportional response to only those portions of said composite signal current which are of the same polarity as its first direct current component and are smaller in amplitude than twice its first direct current component, otherwise providing substantially no response, thereby to provide a limited unidirectional response current to said composite signal current;

means for supplying a second direct current component in predetermined ratio to said first direct current component; and

means for linearly combining said second direct current component with said unidirectional response current in such proportion as to obtain a response with no accompanying quiescent current component, said response being said symmetrically limited bidirectional signal current.

4,004,243
AMPLIFIER WITH CURRENT GAIN INVERSELY PROPORTIONAL TO TRANSISTOR H_{fe}

Abel Ching Nam Sheng, Morris Plains, N.J., assignor to RCA Corporation, New York, N.Y.

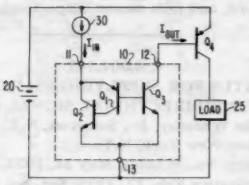
Filed Nov. 19, 1975, Ser. No. 633,479
Int. Cl.² H03F 3/04
U.S. Cl. 330—22 7 Claims

7. A circuit for supplying quiescent base bias current to a first bipolar transistor of a first conductivity type, said first bipolar transistor having a base electrode, which circuit comprises:

a second bipolar transistor of said first conductivity type, said second transistor having base and emitter and collector electrodes;

third and fourth bipolar transistors of a second conductivity type complementary to said first conductivity type, each of said third and said fourth transistors having base and emitter and collector electrodes and exhibiting current gain similar to that of the other;

a collector-to-base feedback connection of said third transistor to condition it to accept input current applied between its collector and emitter electrodes, said feedback connection including



a common-base amplifier connection of said second transistor with its emitter electrode having the collector electrode of said third transistor connected thereto and with its collector electrode being connected to the base electrode of said third transistor; and

a base-to-base connection of said second and said fourth transistors; and

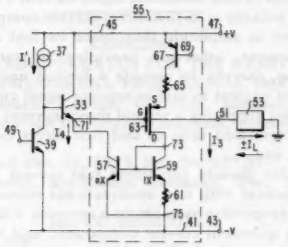
means for applying the collector current flowing through the collector electrode of said fourth transistor to the base electrode of said first bipolar transistor as the entire said quiescent base bias current.

4,004,244

DYNAMIC CURRENT SUPPLY

Otto Heinrich Schade, Jr., N. Caldwell, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 27, 1975, Ser. No. 581,045
Int. Cl.² H03F 3/04
U.S. Cl. 330—22 **20 Claims**



11. An amplifier comprising, in combination:

first and second terminals for an operating voltage source;

a transistor having base, emitter and collector electrodes, connected at its collector electrode to the first of said terminals;

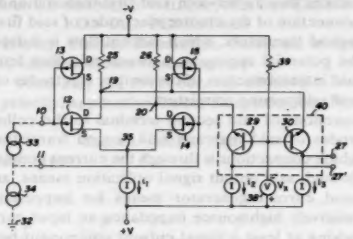
controllable impedance means coupling said emitter electrode to said second terminal, further including means responsive to the voltage at said emitter electrode, when it approaches the voltage at said second terminal, for reducing the impedance of said controllable impedance means between said emitter electrode and said second terminal to a value such that the voltage between said two terminals reduces to lower than $1V_{be}$, $1V_{be}$ being the voltage between the base and emitter electrodes of a transistor which is necessary to support conduction through the transistor.

4,004,245

WIDE COMMON MODE RANGE DIFFERENTIAL AMPLIFIER

Sam S. Ochi, San Jose, and Ronald W. Russell, Sunnyvale, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed May 3, 1976, Ser. No. 682,287
Int. Cl.² H03F 3/45
U.S. Cl. 330—30 D **8 Claims**



1. A differential amplifier having a pair of signal input terminals, at least one output terminal, and a pair of supply terminals for connecting said amplifier to the positive and negative terminals of a source of power, said amplifier comprising:

first, second, third, and fourth FETs, each having a source, a drain, and a gate electrode;

means coupling the sources of said first and second FETs together and to a source of constant current referenced to one of said supply terminals:

means coupling the drain terminals of said third and fourth FETs together and to the other of said supply terminals,

means coupling the drain of said first FET and the source of said third FET together and to a first low impedance load element,

means coupling the drain of said second FET and the source of said fourth FET together and to a second low impedance load element,

means coupling the gates of said first and said fourth FETs together and to one of said input terminals, and

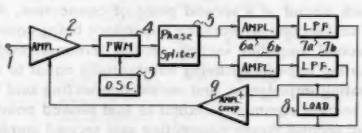
means coupling the gates of said second and said third FETs together and to the other of said input terminals, whereby differential signals between said input terminals produce differential signals in said first and said second low impedance load elements and common mode signals applied to said input terminals result in virtually no load element signal response over a range that exceeds the voltage levels of both supply terminals.

4,004,246

PULSE WIDTH MODULATED SIGNAL AMPLIFIER

Osamu Hamada, 3-4-7 Nakamagome, Ota Tokyo, Japan

Filed June 3, 1975, Ser. No. 583,461
Claims priority, application Japan, June 6, 1974, 49-64304
Int. Cl.² H03F 3/38
U.S. Cl. 330—10 **9 Claims**



1. A pulse width modulated signal amplifier comprising:

a. signal input means;

b. amplifying means for amplifying an input signal from said signal input means;

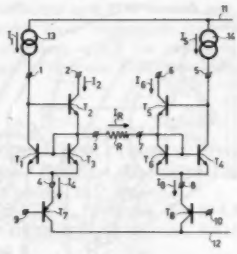
c. pulse width modulating means for receiving an output signal from said amplifying means and producing a pulse width modulated signal;
d. phase splitting means for receiving said pulse width modulated signal and producing a pair of corresponding pulse width modulated signals having different polarities to each other;
e. first demodulating means for receiving one of said pair of pulse width modulated signals and demodulating to produce a first output signal having one polarity and an amplitude in response to an amplitude of said input signal;
f. second demodulating means for receiving the other of said pair of pulse width modulated signals and demodulating to produce a second output signal having the other polarity and an amplitude in response to an amplitude of said input signal;
g. a load supplied with said first and second output signals;
h. amplitude comparing means for comparing said first and second output signals in their amplitudes and producing a difference control signal in response thereto; and
i. feedback means connected to said comparing means for receiving said control signal and applying it to said amplifying means so as to balance the amplitudes of said first and second output signals with respect to one another across said load.

4,004,247

VOLTAGE-CURRENT CONVERTER

Rudy Johan Van de Plassche, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed June 11, 1975, Ser. No. 586,051
Claims priority, application Netherlands, June 14, 1974, 7407953; Mar. 27, 1975, 7503664
Int. Cl.² H03F *3/45*
U.S. Cl. 330—30 D **4 Claims**



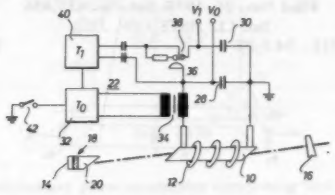
1. A voltage-current converter with a balanced-voltage input and a balanced-current output, comprising:
a first current mirror circuit comprising first and second transistors, each having an emitter, base and collector, and a first semiconductor junction having an anode and cathode, said first and second transistors and said first semiconductor junction all being of a first conductivity type, said cathode of said first semiconductor junction being connected to said emitter of said first transistor, said collector of said first transistor being connected to said base of said second transistor, and said base of said first transistor being connected to said anode of said first semiconductor junction and said emitter of said second transistor;
a second current mirror circuit comprising the same elements as said first current mirror circuit;
a first current source circuit connected to said collector of said first transistor of said first current mirror circuit;
a second current source circuit connected to said collector of said first transistor of said second current mirror circuit;
a first impedance connected between said emitter of said second transistor of said first current mirror circuit and said emitter of said second transistor of said second current mirror circuit; and
third and fourth transistors each having an emitter, base and collector, said emitter of said third transistor being connected to said emitter of said first transistor of said first current mirror circuit said emitter of said fourth transistor being connected to said emitter of said first transistor of said second current mirror;
the balanced-voltage input being between said bases of said third and fourth transistors, and the balanced-current output being between said collector of said second transistor of said first current mirror circuit and said collector of said second transistor of said second current mirror circuit.

4,004,248

CONTROL OF TIMING OF LASER OPERATION

Alexander Müller, and Gerald R. Willenbring, both of Gottingen, Germany, assignors to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V., Gottingen, Germany

Filed Mar. 5, 1975, Ser. No. 555,452
Claims priority, application Germany, Apr. 19, 1974, 2418981
Int. Cl.² H01S *3/092*
U.S. Cl. 331—94.5 P **13 Claims**



1. In the art of controlling operation of a laser, a method to decrease time jitter of laser action after occurrence of an event at a reference time (T_o), and in which the laser is stimulated to emission after having received pumping pulse light energy, comprising the steps of
applying a main pulse (24) to the laser, of lesser energy than necessary to stimulate the laser to emission; and superimposing on said main pulse, during the persistence thereof, an auxiliary pulse (26) to apply to the laser the composite of the auxiliary pulse superimposed on the main pulse, the auxiliary pulse being of sufficient energy to raise the laser above threshhold, the auxiliary pulse having a duration and energy which are small with respect to the duration and energy of the main pulse.

4,004,249

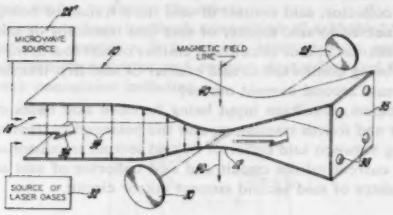
OPTICAL WAVEGUIDE LASER PUMPED BY GUIDED ELECTROMAGNETIC WAVE

Tom T. Kikuchi, Santa Barbara, Calif., assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 22, 1976, Ser. No. 651,448
Int. Cl.² H01S *3/09*
U.S. Cl. 331—94.5 P **5 Claims**

1. Means for pumping an optical waveguide laser comprising
means for generating high energy density electromagnetic waves including a tapered waveguide having a wide portion gradually diminishing to a narrow throat portion which is elongated along an axis, and a source of electromagnetic waves coupled to the wide portion so that high energy density electromagnetic waves are produced in the region of the throat portion, and
an elongated optical waveguide defined in the region of the

throat portion and extending parallel to the said axis, the optical waveguide containing laser material whereby the



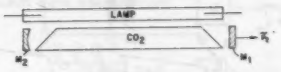
high energy density electromagnetic waves are coupled to the laser material for pumping thereof.

4,004,250

LASER ACTION BY OPTICALLY DEPUMPING LOWER STATES

William F. Krupke, Pleasanton, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Nov. 26, 1975, Ser. No. 635,456
Int. Cl.² H01S *3/09, 3/22*
U.S. Cl. 331—94.5 PE **9 Claims**



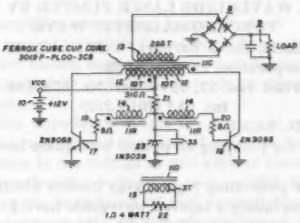
1. A method for obtaining laser action in a gaseous lasing medium contained in a resonant cavity, between an upper energy level and a lower energy level of the medium comprising the steps of: populating the upper level to a degree short of achieving an inverted population, and establishing an inverted population by transiently and selectively depumping the lower level, and stimulating the emission between the upper and lower energy levels of a laser beam via said resonant cavity.

4,004,251

INVERTER TRANSFORMER

Joseph P. Hesler, Liverpool, and Samuel M. Korzekwa, Baldwinsville, both of N.Y., assignors to General Electric Company, Syracuse, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,099
Int. Cl.² H03K *3/281*
U.S. Cl. 331—113 A **10 Claims**



1. A transformer adapted to be coupled to a pair of switching devices to form an inverter having:

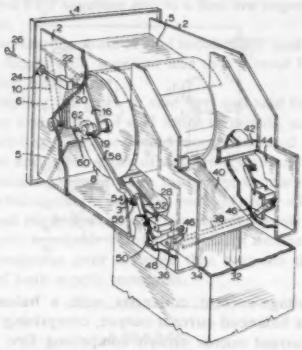
1. a core of substantially linear magnetic material providing a closed magnetic path along which a working cross-section is maintained for the principal flux, said path being divided for part of its length in two branches between which the principal flux may be steered with a relatively small magnetomotive force, said core being assembled from two members which are butted at the branch to permit encirclement of one of said branches by a preformed winding,
2. a center tapped primary power winding encircling said working cross-section, each end of which is adapted to be connected to an output electrode of one of a pair of alternately conducting electronic switches, and the center tap of which is adapted to be connected to a d.c. source to cause the principal flux in said core to alternate,
3. a secondary power winding encircling said working cross-section for deriving an alternating voltage output.
4. first control winding means adapted to be connected to said switches to cause alternate conduction, said winding encircling one branch and providing regenerative feedback during each conduction period which terminates when said one branch saturates, and
5. second control winding means encircling one of said branches for providing a magnetomotive force for causing said one branch to saturate first in each conduction period to remove the regenerative feedback before saturation of the working cross-section.

4,004,252

SAFE DEPOSIT APPARATUS, WITH SELECTIVE PLATE AND SHIELD FOR DUAL FUNCTION DEPOSITORY

Michael H. Markham, 2642 Islington Ave., and Joseph Varga, 61 Richview Road, No. 1910, both of Toronto, Ontario, Canada

Filed Oct. 14, 1975, Ser. No. 622,136
Int. Cl.² B65G *11/04*
U.S. Cl. 232—44 **4 Claims**



1. Safe deposit apparatus comprising means defining an opening through which deposits may be inserted, means for receiving deposits, and means for accepting deposits from said opening and discharging them into said receiving means, wherein a shield is provided mounted for movement relative to said opening defining means between a position substantially obturating said opening except for a limited aperture and a position substantially clear of said aperture, wherein the means for receiving deposits comprises two separate compartments, wherein a diverter member is located at the entrances of said compartments, means being provided operatively linking said diverter member to said shield member whereby the former is moved between positions obturating one or other of the entrances of said compartments when said shield member is moved between its obturating or non-obturating positions relative to said aperture, and wherein the means accepting deposits from the opening and discharging them into said receiving means is a rotary depository drum having a periph-

eral aperture movable on rotation of the drum to face said aperture or said compartments.

4,004,253

VARIABLE EQUALIZER

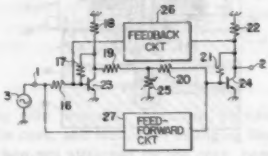
Yoshitaka Takasaki, Tokorozawa; Narimichi Maeda, Kodaira; Jun'ichi Nakagawa, Saitama; Kohei Ishizuka, and Yasuhiro Kita, both of Hachioji, all of Japan, assignors to Hitachi, Ltd., Japan

Filed June 18, 1975, Ser. No. 587,894

Claims priority, application Japan, June 21, 1974, 49-70239; July 5, 1974, 49-76380

Int. Cl.² H03H 7/14

U.S. Cl. 333—28 R 25 Claims



1. A variable equalizer comprising:

an input terminal to which an input signal is applied;

an output terminal from which an output signal is derived;

a first transmission network provided in the forward path from said input terminal to said output terminal;

a second transmission network provided in the feedback path from said output terminal to said input terminal; and

a third transmission network provided in the feedforward path from said input terminal to said output terminal, wherein

said first transmission network has a frequency independent transfer coefficient and said second and third transmission networks have respective frequency dependent transfer coefficients which are nearly equal in absolute value and are of opposite polarities with respect to each other.

4,004,254

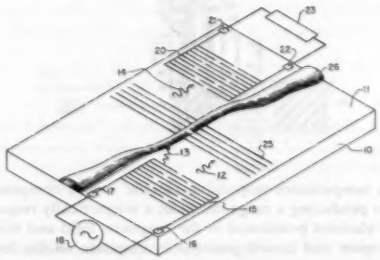
SWIF WITH SIDE LOBE COMPENSATION BARRIER

Adrian J. DeVries, Elmhurst, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Apr. 3, 1975, Ser. No. 564,940

Int. Cl.² H03H 9/26, 9/30, 9/32; H01L 41/10

U.S. Cl. 333—30 R 6 Claims



1. An acoustic surface wave device comprising:

a piezoelectric substrate defining a wave propagating surface;

a transmitting and receiving transducer pair for launching and receiving acoustic surface waves, formed at offset positions on said surface, each including a plurality of interleaved conductive fingers and defining a primary axis of propagation and reception;

a multistrip coupler, including elongated conductive elements, interposed between said transducers such that said elements are substantially parallel to said transducer fingers, converting surface waves launched by said transmitting transducer along its primary axis to waves along said primary axis of said offset receiving transducer; and

barrier means in the main energy coupling path, interposed between said transducers, reducing propagation of surface waves between said transducers along directions other than said primary axes.

4,004,255

MICROWAVE FREQUENCY PHASE MODULATOR

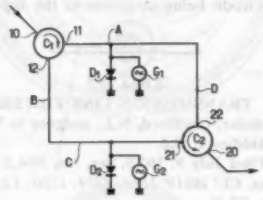
Roland Chapnikoff, Orsay, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France

Filed July 2, 1975, Ser. No. 592,511

Claims priority, application France, July 25, 1974, 74.25934

Int. Cl.² H01P 1/18, 1/38; H03C 7/02, 3/22

U.S. Cl. 333—31 R 3 Claims



1. A microwave phase modulator comprising first and second three-access circulators, the first accesses of the first and second circulators serving, respectively, as the input and the output access of the modulator, the second accesses being connected to one another by way of a first path having a first diode arranged therein and the third accesses being connected to one another by way of a second path having a second diode arranged therein, the two paths being of different electrical length and the two diodes being connected to voltage supplies such that they are each rendered conductive or blocked in phase opposition with each other.

4,004,256

HIGH FREQUENCY AMPLIFIER STAGE WITH INPUT REFERENCE TRANSLATION AND OUTPUT MATCHING

David M. Duncan, P.O. Box 97, Main Post Office, San Francisco, Calif. 94101

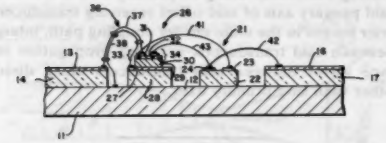
Continuation-in-part of Ser. No. 477,991, June 10, 1974, abandoned. This application July 16, 1975, Ser. No. 596,362

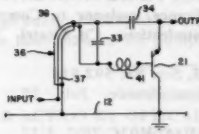
Int. Cl.² H03H 7/38

U.S. Cl. 333—32 12 Claims

1. In an amplifier stage: a substrate having a generally planar surface at ground potential, a first conductor spaced from the surface of the substrate and forming therewith an input line, a second conductor spaced from the surface of the substrate and forming therewith an output line, a transistor having emitter, base and collector electrodes, the collector electrode being mounted directly on the surface of the substrate and connected electrically thereto, a transmission line having a first lead connected between the first conductor and a second one of the electrodes and a second lead connected between the substrate and the third one of the electrodes whereby input signals from the input line are applied to the second and third electrodes of the transistor, and means connecting the third electrode of the transistor to the second conductor

whereby output signals are applied to the output line from the third electrode and the collector electrode of the transistor,





the third electrode being common to the input and output circuits.

4,004,257

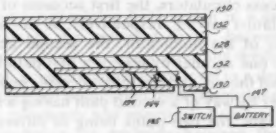
TRANSMISSION LINE FILTER

Robert G. Geissler, Cranford, N.J., assignor to Vitek Electronics, Inc., Middlesex, N.J.

Filed July 9, 1975, Ser. No. 594,270

Int. Cl.² H01P *1/14, 7/04, 1/20, 11/00*

U.S. Cl. 333—73 C **25 Claims**



1. A coaxial filter having two ends for insertion between transmission lines comprising an inner conductor, at least one conductive outer sheath, first insulation means separating said inner conductor from said outer conductive sheath, a section of conductive line extending longitudinally within said first insulation means laterally spaced apart from said inner conductor and electrically coupled thereto, second insulating means covering said outer sheath and coaxial terminal connectors at the opposite ends of said coaxial filter to permit said coaxial filter to be interconnected between the transmission lines, one of said terminal connectors serving as the filter output and wherein the length of the section of conductive line is approximately λ/4, wherein λ is the wavelength of the signal to be filtered by the coaxial filter.

4,004,258

POSITION INDICATING PULSE LATCHING SOLENOID

Kurt Arnold, West Caldwell, N.J., assignor to Valcor Engineering Corporation, Kenilworth, N.J.

Filed Nov. 20, 1974, Ser. No. 525,349

Int. Cl.² H01H *73/12*

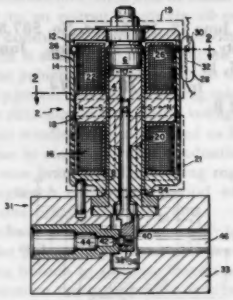
U.S. Cl. 335—17 **10 Claims**

1. A position indicating solenoid comprising:

a. a housing,

b. a continuous source of magnetic flux mounted in said housing,

c. first and second alternately activated magnetic circuits contained in said housing and linked to said continuous source of magnetic flux, each of said circuits having a common magnetic member movably mounted in said housing between said first and second magnetic circuits to alternately close one of said circuits while opening the other, such movement of said common member causing the flux flow to move between said first and second circuits with said common member when said first circuit is closed by said common movable member,



d. means included in said first magnetic circuit permitting flux leakage upon activation of said circuit, and

e. sensing means mounted proximate to said flux leakage means responsive to said leakage flux for determining the position of said common movable member.

4,004,259

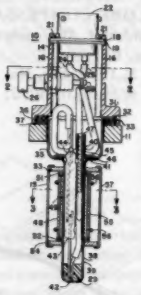
TEMPERATURE RESPONSIVE ELECTRIC SWITCH

Ward Barry Krause, Alexander, N.C., assignor to Square D Company, Park Ridge, Ill.

Filed June 25, 1975, Ser. No. 590,359

Int. Cl.² H01H *61/00;* **H01F** *13/00*

U.S. Cl. 335—146 **11 Claims**

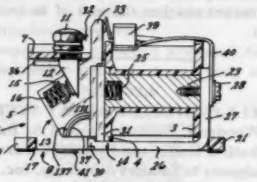


1. A temperature responsive electric switch comprising: a magnet producing a magnetic field; a magnetically responsive switch element positioned in the magnetic field and movable to an open and closed position in response to the level of magnetic flux through said switch element; a compensating element formed of ferromagnetic material and having a magnetic permeability varying as a function of its temperature positioned in the magnetic field to shunt magnetic flux around the switch element at a level varying as a function of its temperature; and an adjusting element adjacent the switch element and movable to positions in the magnetic field to thereby bypass a selected portion of the magnetic flux around the switch element.

4,004,260
POWER RELAY

Anton Happach, Munich, Germany, assignor to Schaltbau Gesellschaft mbH, Munich, Germany

Filed June 26, 1975, Ser. No. 590,416
Claims priority, application Germany, July 12, 1974, 2433536
Int. Cl.² H01H 85/02
U.S. Cl. 335—202 11 Claims



1. A relay with pivotable armature, an energizible coil, a magnetizable core, and means for changing the position of the armature when not attracted by the core, comprising:

a tubular body, open at both ends and provided with first and second end flanges, the tubular body being the carrier for the coil and receiving the core;

a top wall and two side walls integral therewith or connected thereto and extending from two opposite edges of the top wall at right angles, the top wall and the side walls extending from the first flange to define therewith a box-like enclosure having an open side opposite the first flange and an open bottom opposite the top wall;

the top wall having at least one opening, there being a contact piece fastened to the top wall at the opening and projecting through the opening into the box-like enclosure;

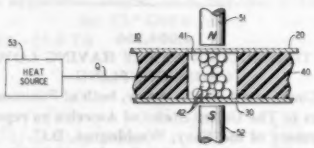
guide means at said side walls inside of said enclosure for pivotally supporting the armature; and

a counter contact on the armature for making contact with said contact piece and receding from the contact piece upon actuation of said armature.

4,004,261
CONNECTION DEVICE

Alfred Simeon Klingenberg, Whippany, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 11, 1975, Ser. No. 567,184
Int. Cl.² H01F 3/00
U.S. Cl. 335—280 8 Claims



1. A connection device comprising:

first and second conductors each coated with a material having a melting point above 85° F;

an insulator separating the two conductors, the insulator having an aperture between the two conductors;

a plurality of magnetic balls contained within the aperture by the two conductors, each ball being coated with the material;

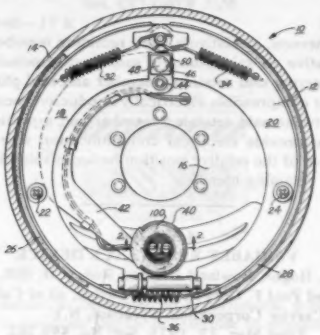
means for magnetically aligning the balls to establish an electrical connection between the two conductors; and

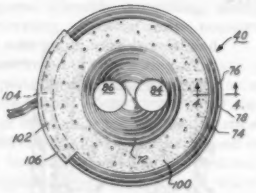
means for heating the material to its melting point, which material upon termination of heating solidifies fusing the balls and the conductors together into a permanent connection between the conductors.

4,004,262
ELECTROMAGNET FOR PROVIDING BALANCED FRICTION FACE PRESSURES ON AN ARMATURE IN A VEHICLE ELECTRIC BRAKE SYSTEM

Leroy K. Grove, 512 S. Merrifield Ave., Mishawaka, Ind. 46544

Filed Mar. 11, 1975, Ser. No. 557,251
Int. Cl.² H01F 7/08; F16D 65/34
U.S. Cl. 335—281 15 Claims





1. An electromagnet for use in electric brakes, clutches and the like having an armature rotating relative to said electromagnet and an actuating arm attached to and restraining said electromagnet, comprising a body of low reluctance magnetic material having an inner pole and an outer pole defining a cavity and having leading and trailing edges relative to the normal forward rotation of the armature, an electric coil disposed in said cavity, said poles having planar faces for engaging the armature, with the leading edge of said outer pole which first engages the oncoming armature face having a recess therein forming a non-magnetic sector, and a nonmagnetic wear member in said cavity and recess for engaging the armature, said non-magnetic sector on the leading edge of said outer pole being of a size of at least 45° taken from a point on the center line spaced from the leading edge equal in distance to the distance from the center line to the lateral side edges at right angles to said center line.

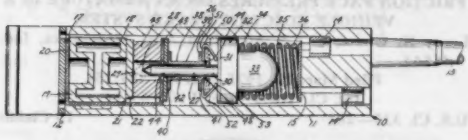
4,004,263
PROTECTOR MODULE FOR TELEPHONE SYSTEMS

William V. Carney, Valley Stream, N.Y., assignor to Porta Systems Corporation, Syosset, N.Y.

Filed June 9, 1975, Ser. No. 584,768
Int. Cl.² H01H 39/00
U.S. Cl. 337—32 4 Claims

1. In a telephone line protective module of a type including means for conducting excessive voltage surges through an

arcing device to a source of ground potential, and heat-responsive means for conducting excessive currents to said source of ground potential, the improvement comprising: means selectively providing an electrically conductive path to said source of ground potential by-passing said arcing device, upon actuation of said heat-responsive means; said means including a spring-loaded terminal member having a shaft-like



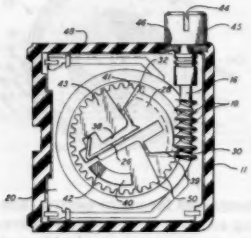
plunger thereon, a relatively fixed retaining member slidably fitted relative to said plunger, said heat-responsive means interconnecting said retaining member and said plunger, and an annular compressible electrically conductive member positioned between said retaining member and a portion of said plunger to provide electrical communication therebetween, irrespective of the relative position between said plunger and said fixed retaining member.

4,004,264

VARIABLE RESISTANCE DEVICE

Ronald P. Hogue, Rowland Heights; Robert D. Hill, Jr., Santa Ana, and Paul F. Gerwitz, West Covina, all of Calif., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Mar. 17, 1975, Ser. No. 559,282
Int. Cl.² H01C *10/30*
U.S. Cl. 338—174 **9 Claims**



1. A variable resistor comprising:

a housing;

a substrate member of non-conductive material supported by the housing, said substrate member having a conductive track and a resistive track disposed on a first surface thereof;

movable contact means electrically connecting said resistive and conductive tracks, said contact means including a gear having a sector devoid of gear teeth, said contact means further having a groove formed on a surface thereof remote from said substrate member and disposed substantially parallel thereto;

a worm screw having a helically formed thread in engagement with said gear of said contact means, rotation of said screw causing said contact means to move along the conductive and resistive tracks;

stop means having a first portion connected to said contact means and movable therewith and a second portion connected to a fixed section of said variable resistor, said first and second portions, engaging to prevent further movement of said contact means in the same direction as the contact means approaches the ends of the conductive and resistive tracks; and

a ratchet member including a single elongated spring attached to a body portion, said body portion having two rigid legs extending therefrom, said spring being disposed within said groove formed in said remote surface of said contact means, said rigid legs being disposed within the sector of said gear, each of said legs being disposed adjacent a gear tooth defining the boundary of said sector, one of said legs being the sole element in engagement with the threads of said worm screw when said contact means reaches the end of its travel in a first direction, and the other of said legs being the sole element in engagement with the threads of said worm screw when said contact means reaches the end of its travel in a second direction.

4,004,265

SELF-PROPELLED ARRAY SYSTEM

Thomas E. Woodruff, Nashua; Samuel S. Ballard; Roger I. Saunders, both of Hollis, and Everett W. Farmer, Nashua, all of N.H., assignors to Sanders Associates, Inc., South Nashua, N.H.

Continuation-in-part of Ser. No. 494,154, Aug. 2, 1974, abandoned. This application Apr. 28, 1976, Ser. No. 681,086
Int. Cl.² G01S *3/80*
U.S. Cl. 340—2 **28 Claims**

1. A hydrophone array system comprising a first cable, a plurality of hydrophones connected to said first cable and spaced apart by predetermined distances thereby forming an array, a buoyant body, a transmitter within said body, a second cable extending from said body, and means including said cables for conducting signals from said hydrophones to said transmitter characterized in that said system includes a thruster connected to one end of said first cable for urging it in a preferred direction and a member connected to the other end of said first cable for resisting the urging of said thruster and in that said first cable includes a section adjacent to said thruster which section comprises a first resilient portion and a second, signal carrying portion, said second portion being longer than said first portion, said portions being fastened to each other at each of their ends so that said second portion remains in a slack condition.

4,004,266

TRANSDUCER ARRAY HAVING LOW CROSS-COUPLING

Rufus L. Cook, and Lyles C. Adair, both of Panama City, Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 5, 1975, Ser. No. 638,013
Int. Cl.² H04B *13/00*
U.S. Cl. 340—9 **4 Claims**

1. A sonar array suitable for simultaneous transmission and reception of acoustic energy of a predetermined wavelength into and from an aqueous medium, said array including a rigid metal baffle plate having a plurality of recesses therein arranged in a predetermined pattern and a plurality of electroacoustic transducers, each received in a corresponding one of said recesses and presenting a surface substantially flush with said plate, said array being characterized by the improvement wherein each of said transducers comprises:

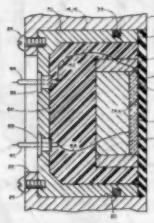
a rigid metal cup-shaped body having a rim surface;

a disc-shaped piezoelectric element that is substantially one-half of said wavelength in thickness and comprises electrode means on opposite faces thereof, one of said faces being directed inwardly of said cup-shaped body and the other of said faces being directed outwardly thereof;

a substantially congruent disc of a first low acoustic impedance material cemented to the electrode means on said one of said faces of said piezoelectric element;

a cylinder of said first low acoustic impedance material surrounding and cemented to the periphery of said piezoelectric element and said congruent disc of first low acoustic impedance material;

a potting compound of a second low acoustic impedance material disposed in said cup-shaped body and surrounding said disc and cylinder in supporting relation thereto and to the piezoelectric element therein; and



an acoustic window comprising a circular layer of material having an acoustic impedance substantially matching that of water, said window being secured in overlying relation to said outwardly directed face of said piezoelectric element, to said cylinder of first low acoustic impedance material, to said second low acoustic impedance material potting compound, and to said rim surface of said cup-shaped body;

whereby the periphery and said inwardly directed face of said piezoelectric element are separated from said cup-shaped body by both of said first and second low acoustic impedance materials and adjacent ones of said transducers in said array are characterized by cross-coupling of less than about −75 db.

4,004,267

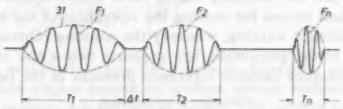
DISCRETE FREQUENCY SEISMIC EXPLORATION USING NON UNIFORM FREQUENCY SPECTRA

William Harry Mayne, San Antonio, Tex., assignor to Geosource Inc., Houston, Tex.

Continuation of Ser. No. 309,952, Nov. 28, 1972, abandoned. This application May 8, 1975, Ser. No. 575,823

Int. Cl.² G01V *1/14*

U.S. Cl. 340—15.5 TA **12 Claims**



1. A method of seismic exploration to obtain a composite seismic signal having a preselected frequency spectrum which comprises:

a. transmitting a set of discrete seismic wave packets of narrow bandwidth into the earth, each of such wave packets being of different bandwidth, and having different center frequencies, wherein most of the center frequencies of the wave packets are substantially related to each other according to the values of a geometric progression within the preselected frequency spectrum and wherein the adjacent spectra of each wave packet overlap at substantially one-half amplitude values,

b. receiving and recording independently the waves returned from the earth due to each such wave packet, and

c. combining recorded waves due to each wave packet, thereby forming a composite signal having the preselected frequency spectrum.

4,004,268

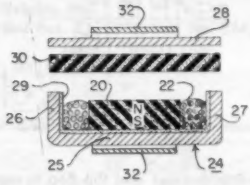
IN-LINE STRESS/STRAIN DETECTOR

John C. Cook, Dallas, Tex., assignor to Teledyne Industries, Inc., Dallas, Tex.

Filed Feb. 6, 1975, Ser. No. 547,674

Int. Cl.² G01V *1/16*

U.S. Cl. 340—17 R **10 Claims**



1. A detector to be buried in a particulate medium and operative to generate signals in response to stressing of said medium and to deliver the signals to a monitoring circuit, comprising:

a. an elongated assembly comprising multiple successive signal-generating detector units connected by cable means to said monitoring circuit; and

b. each detector unit comprising multiple sets of paired opposed plates of magnetic material, the opposed plates being spaced apart in the direction of the thickness dimension of the unit at their central portions and the sets of plates having contiguous edges aligned with each other along the length dimension of the detector unit which is great as compared with its width and which edges closely approach each other to form air gaps, magnet means extending longitudinally between the central portions of the paired plates and spaced from their lateral edges and said magnet means having opposed poles spaced in the direction of the thickness dimension and located contiguous to the respective plates, a winding surrounding the width and entire length of the magnet means and disposed in the space between the lateral edges of the plates and the magnet means, and said winding being coupled to the cable means, and resilient strip means interposed between a plate of each pair and said magnet means and yieldably maintaining the air gaps by keeping the plates mutually separated at their peripheries.

4,004,269

BRAKE LINING WEAR WARNING SYSTEM

Hiroshi Arai, Toyota, and Koichi Taniguchi, Kariya, both of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of Japan

Filed July 25, 1974, Ser. No. 491,777

Claims priority, application Japan, July 28, 1973, 48-85082

Int. Cl.² B60T *17/22*

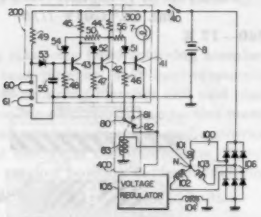
U.S. Cl. 340—52 A **11 Claims**

1. A brake lining wear warning system for a vehicle comprising:

a. a probe for placement in a brake lining and defining a current path which becomes electrically non-conductive when said brake lining wears down to a critical value;

b. switch means for connecting and disconnecting said probe to a power supply;

c. a holding circuit including a flip-flop having first and second stable states and reset means connected to said flip-flop for causing, when operated, said flip-flop to assume said first state, means for connecting said flip-flop to said probe for causing said flip-flop to shift into said second state in response to the nonconductive condition of said probe path and to remain in that state and produce a wire breakage detection signal even if thereafter the nonconductive condition of said probe path changes to a conductive condition, said reset means including means operated by said switch means for applying a reset signal



to said flip-flop to reset said flip-flop irrespective of the electric nonconductivity of said probe path when said switch means reconnects said power supply to said probe;

d. warning means connected to said flip-flop for giving a warning indication in response to said wire breakage detection signal, said warning means including gate means for preventing a checking means from operating on said holding circuit so as to apply a check signal only to said warning means; and

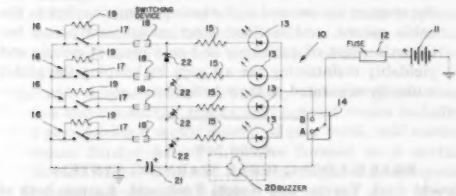
e. said checking means connected to said warning means for producing said check signal to operate, upon checking, said warning means irrespective of said probe and said holding circuit.

4,004,270

ELECTRONIC TIRE PRESSURE ALARM CIRCUITRY

William Eugene Claxton, Mogadore; James Dennis Gardner, Akron, and Marvin Lynn Janssen, North Canton, all of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Feb. 17, 1976, Ser. No. 658,786
Int. Cl.² B60C *23/00*
U.S. Cl. 340—58 **12 Claims**



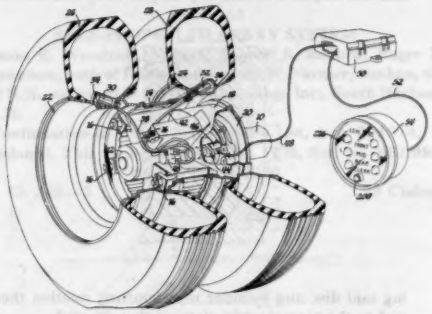
1. An electronic alarm circuit for indicating an abnormal pressure condition in a pneumatic tire on a vehicle comprising, power means providing an output signal, indicator means electrically connected to said power means to provide a first identifiable signal indicative of an abnormal pressure condition in the pneumatic tire and a second identifiable signal to test the circuit, actuation means electrically connected to said indicator means and communicating with the internal pressure of the tire to activate said indicator means to provide said first and second identifiable signals and intermittent switch means electrically connected between said indicator means and said actuation means and closing once each revolution of the tire so that said first and second identifiable signals are intermittent.

4,004,271

LOW TIRE PRESSURE WARNING SYSTEM

Harold A. Haven, Hale, and John A. Stewart, Flint, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 532,404, Dec. 13, 1974. This application Aug. 1, 1975, Ser. No. 601,319
Int. Cl.² B60C *23/02*
U.S. Cl. 340—58 **4 Claims**



1. A pneumatic tire low pressure warning system comprising: a wheel; a pneumatic tire carried by the wheel, the tire being normally inflated to a specified pressure; a low pressure air switch, the low pressure air switch including a housing secured to the wheel and having a cavity therein exposed to the internal pneumatic tire pressure temperature, a normally closed valve unit carried on the housing and having an inlet side exposed to the internal tire pressure and having an outlet side, a bellows within the cavity, means coupling the bellows and the normally closed valve unit, the normally closed valve unit being opened when the bellows is extended, and a manually actuated equalizer valve extending through the wheel and being operable to selectively provide pneumatic communication between the bellows interior and the pneumatic tire interior and seal the bellows interior from the pneumatic tire interior, the equalizer valve being operated to provide pneumatic communication between the interior of the tire and the bellows when the tire is at the specified pressure and thereafter closed so as to establish a temperature variable reference pressure within the bellows, the bellows being extended when the air pressure in the pneumatic tire decreases to a certain level below the reference pressure within the bellows to open the normally closed valve unit; an actuator carried by the wheel external of the pneumatic tire; means pneumatically coupling the outlet side of the normally closed valve unit to the actuator, the actuator being operated by tire air supplied thereto when the normally closed valve unit is opened by the bellows; and means for sensing the operation of the actuator and providing a warning, whereby the warning represents the decrease in the pneumatic tire pressure below the manually set, temperature variable reference pressure in the bellows.

4,004,272

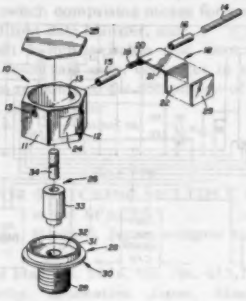
OPTICAL PRESSURE SWITCH

William Eugene Claxton, Mogadore, and Bruce Milan Cernik, Medina, both of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Filed July 21, 1975, Ser. No. 597,809
Int. Cl.² B60C *23/04*; **G01D** *5/34*
U.S. Cl. 340—58 **6 Claims**

1. Apparatus for giving an optical indication of the internal pressure condition of a pressurized member comprising a

housing having a window therein; an angular member movably mounted within said housing, said angular member having a first portion angular to a second portion; reflecting means mounted on said second portion of said angular member; pin means suspending said angular member in said housing so that said reflecting means is movable from one position, aligned with the window to receive light from a remote light source and reflect the same through the window, to another position



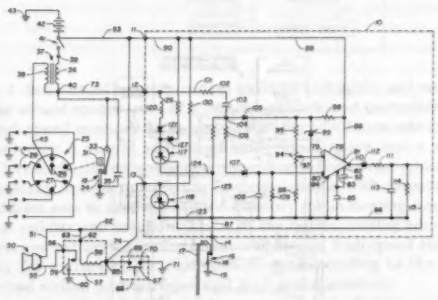
misaligned with the window and the light from the remote source; actuator means supporting said first portion of said angular member and communicating with the internal pressure of the pressurized member to allow said reflecting means to move from said one position to said another position dependent upon the internal pressure of the pressurized member; and biasing means carried by said pin means and contacting said first portion of said angular member to urge said first portion toward said actuator means.

4,004,273

ENGINE SPEED RESPONSIVE ANTI-THEFT DEVICE FOR VEHICLE

Thomas A. Kalogerson, 4617 Terracewood Drive, Minneapolis, Minn. 55437

Filed Aug. 28, 1975, Ser. No. 608,572
Int. Cl.² G08B *13/22*
U.S. Cl. 340—64 **8 Claims**



1. An anti-theft device for a vehicle driven by an internal combustion engine having an ignition system including a plurality of igniters, a transformer having a secondary selectively connected to said igniters for energizing the same, and switching means driven by said engine for periodically interrupting the current flowing through the primary of said transformer, said device comprising:

disabling means for connection to an internal combustion engine for disabling the engine,

speed responsive means responsive to the speed of the engine and comprising an electronic speed sensing means adapted to be connected across such a switching means and generate a voltage dependent upon the speed with which said switching means is actuated and means responsive to said voltage connected to said disabling means and effective when said voltage exceeds a value indicative of the predetermined value of engine speed to actuate said disabling means regardless of the speed of the vehicle,

manually operable means for rendering said disabling means ineffective when the vehicle is to be driven by an authorized driver,

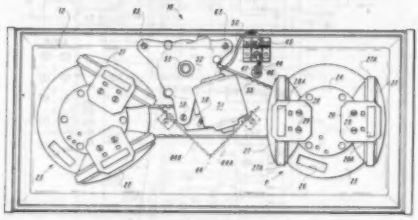
and means for maintaining said disabling means effective after actuation thereof until said manually operable means is operated, regardless of the time intervening until said manually operable means is operated.

4,004,274

SIGNAL LIGHT ASSEMBLY

Kenneth W. Menke, Glendale, and Michael D. Latta, Ladue, both of Mo., assignors to Public Safety Equipment, Inc., Maryland Heights, Mo.

Filed Oct. 22, 1975, Ser. No. 624,912
Int. Cl.² B60Q *1/00*
U.S. Cl. 340—84 **9 Claims**



5. In a flashing signal light beacon for vehicle recognition, the improvement of: a base; a pair of posts fixed relative to said base and extending therefrom in spaced parallel positions; a light pod carried on each post, each pod including a frame assembly slidably disposed over each post, each frame assembly having a drive gear and means to receive and attach lamps in angularly spaced relation about said fixed post, the lamps in a first one of said frame assemblies being in a different angular orientation from the lamps in the second one of said frame assemblies; an electrical circuit connection through said fixed posts to said lamps, said rotating frame assemblies being the other side of the electrical circuit; a drive gear hub on each frame assembly; and drive means on said base operatively connected to each of said drive gear hubs to rotate said frame assemblies of each pod, the rotation of said frame assemblies directing the light from said lamps to sweep an azimuth areas of about 160° forwardly and rearwardly of the vehicle and produce from a remote position of observation within the sweep azimuth area a succession of individual bright light flashes directly from said lamps and intervals of dark between the light flashes.

4,004,275

SELF-CLOCKING DATA ENTRY UNIT SYSTEM

Richard Louis Arndt, Byron, and Thomas Richard Teal, Rochester, both of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 12, 1976, Ser. No. 648,446
Int. Cl.² H04Q *5/00;* **H03K** *1/17;* **H04J** *3/00*
U.S. Cl. 340—168 S **11 Claims**

1. A data entry unit system comprising:

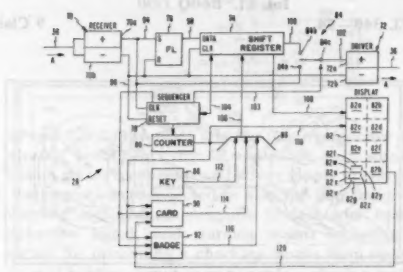
a central controller, a series of remote stations, a transmission line connected with said controller and connecting said remote stations together in a series, said controller being constructed to provide to said line a series of data bits in spaced time positions which are indicative of data

depending on which of the data bits exist or are missing in said positions and a preceding series of control bits and a series of tag bits in time positions following each of the time positions designated for said data bits, said data bits and control bits constituting electrical excursions in one direction from a median electrical value and said tag bits constituting electrical excursions in the other direction from said median electrical value, said remote stations including:

a receiver in each of said stations receiving bits from said controller constructed to distinguish between said bits having excursions in one direction as distinguished from said bits having excursions in the other direction,

means in each of said stations in said series prior to the ultimate one of said stations for transmitting at least some of said data and control and tag bits from said receiver through the station and to said transmission line,

means in each of said stations for accumulating a field of consecutive data bits received by its said receiver from said line,



a data bit utilization means in each of said stations, and

means in each of said stations under the control of one of said control bits for shifting the data bits accumulated in the station to said data bit utilization means in the station.

9. A data entry unit station comprising:

a receiver for bits applied thereto having a first receiver part providing output signals for bit excursions in a first direction and a second receiver part providing output signals for bits applied thereto having excursions in the other direction, a shift register having a data entry terminal connected to the output of said first receiver part, a transmitter having a first transmitter part for providing output signals for excursions of bits applied thereto in said first direction and having a second transmitter part providing output signals for bits having excursions in said other direction, means connecting the output of said second receiver part with the input of said second transmitter part and switch means alternately connecting the input of said first transmitter part with the output of said shift register or with the output of said first receiver part.

4,004,276

TELEPHONE ANSWERING MACHINES

Stephen Perrin Robinson, Camberley; David Charles Evans, Woodley, and Martin Hewitt, Church Crookham, all of England, assignors to Ansafone Limited, Camberley, England

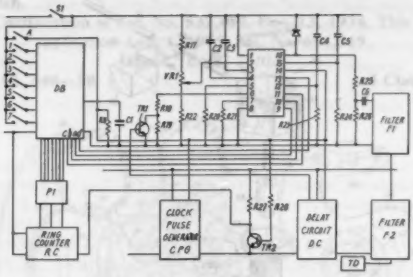
Filed July 25, 1975, Ser. No. 598,938

Claims priority, application United Kingdom, July 26, 1974, 33228/74

Int. Cl.² H04Q 9/00

U.S. Cl. 340—171 A **14 Claims**

1. A decoder device for remotely controllable electrical equipment, the device comprising receiver means having a signal input, an output and a switching input, the receiver means being initially sensitive to a predetermined access signal comprising at least two groups of pulsed electrical signals, each group comprising at least two pulses and each pulse having a predetermined frequency different from the or each adjacent pulse in the same group, the receiver means being adapted, when the said access signal is applied to the signal input thereof, to generate a switching signal at the output thereof, and means for applying the switching signal to the switching input of the receiver means, whereby the receiver means are rendered sensitive to command signals subsequently applied thereto, each command signal comprising a group of at least two pulses, each pulse having a predetermined frequency different from the frequency of the or each adjacent pulse in the group and one pulse in the group having a frequency different from any of the frequencies in the access signal, the receiver means then being adapted, when one of the said command signals is applied thereto, to provide a predetermined output signal.



4,004,277

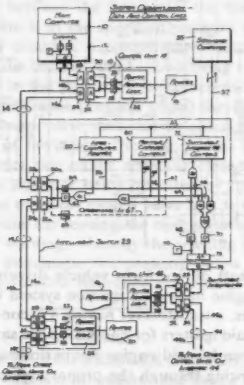
SWITCHING SYSTEM FOR NON-SYMMETRICAL SHARING OF COMPUTER PERIPHERAL EQUIPMENT

Bruce D. Gavril, 444 E. 75th St., New York, N.Y. 10021

Continuation-in-part of Ser. No. 474,196, May 29, 1974, abandoned, which is a continuation of Ser. No. 234,185, March 13, 1972, abandoned. This application May 5, 1975, Ser. No. 574,585

Int. Cl.² G06F 3/04

U.S. Cl. 340—172.5 **119 Claims**



1. A multiprocessor computer system having at least one non-symmetrically shared item of peripheral equipment, comprising:

a main computer,

a secondary computer, and

an intelligent switch connected to said main computer and to said secondary computer, said item of peripheral equipment being connected to said intelligent switch and switchable by said intelligent switch to said main computer or to said secondary computer, said item of peripheral equipment being initially switched to said main computer,

wherein said main computer performs a predetermined first data transfer to said item of peripheral equipment, said intelligent switch comprising means for sensing said predetermined first data transfer, and

said intelligent switch switches said item of peripheral equipment from said main computer to said secondary computer in response to the completion of said predetermined first data transfer.

4,004,278

SYSTEM FOR SWITCHING MULTIPLE VIRTUAL SPACES

Shigeo Nagashima, Hachioji, Japan, assignor to Hitachi, Ltd., Japan

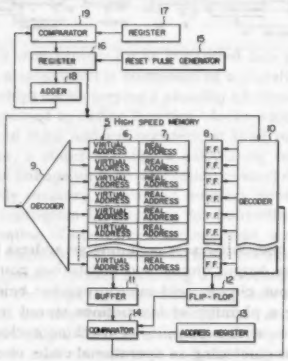
Filed Mar. 18, 1974, Ser. No. 452,138

Claims priority, application Japan, Mar. 19, 1973, 48-30969

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² G06F 9/20

U.S. Cl. 340—172.5 **6 Claims**



1. In a virtual memory system having a real space and multiple virtual spaces used in a switching mode and comprising a high speed memory for storing a plurality of address sets each including a virtual address of said virtual space and a real address of said real space corresponding to the virtual address, indicator means provided in correspondence with respective address sets in said high speed memory for indicating one of the validity and invalidity states of the corresponding address sets and extracting means connected to said high speed memory for extracting the real address corresponding to the referred virtual address from said high speed memory;

a system for switching said virtual spaces including:

addressing means connected to said high speed memory for addressing in succession the address sets in said high speed memory;

first register means for storing at least one special address;

comparing means connected to said high speed memory and said first register means for comparing the virtual address in the address set addressed by said addressing means with the special address in said first register means so as to generate an indication signal when the virtual address in the addressed address set belongs to a region delimited by the special address in which the same virtual addresses in the respective virtual spaces are translated to correspond to different real addresses; and

setting means connected to said comparing means and said indicator means for setting the invalidity state of the addressed address set to the corresponding indicator means in accordance with the indication signal from said comparing means.

4,004,279

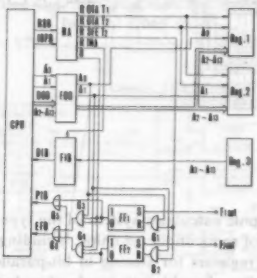
METHOD AND APPARATUS FOR CONTROLLING DATA TRANSFER BETWEEN INPUT AND OUTPUT DEVICES AND A DIRECT DIGITAL CONTROLLER

Kazuo Nezu, Hachioji, Japan, assignor to Yokogawa Electric Works, Ltd., Musashino, Japan

Continuation-in-part of Ser. No. 45,728, June 12, 1970, Pat. No. 3,710,326. This application Nov. 1, 1974, Ser. No. 520,027

Int. Cl.² G06F 3/04; G08B 11/00

U.S. Cl. 340—172.5 **2 Claims**



1. A direct digital controller for interfacing a plurality of operating groups with a digital computer, said computer having

an offering signal input terminal,

an answerback signal input terminal,

a data output bus for supplying digital data signals including register selecting bits,

an input and output device designating bus, and

a control signal bus,

comprising:

a plurality of output registers for each said group;

a flip-flop and set terminal input corresponding to each of said output registers, each said flip-flop operable for storing an offering signal applied to its set terminal;

a decoder circuit for each said group responsive to signals from said input and output designating bus and from said control signal bus of said digital computer to produce decode control signals upon receipt of the respective code signal for a group;

a logic circuit

for applying set signals on said flip-flops to said offering input terminal and

for applying an AND gated signal to said answerback input terminal upon coincidence of said decode control signal for said group, said register selecting bits from said data signal and a set output from the one of said flip-flops corresponding to the register selected by said data signal, thereby producing an answerback signal in said digital computer

said decode control signals providing in response to said answerback signal

a reset signal for the selected output register,

a write in signal for entering data on said data output bus in said selected output register, and

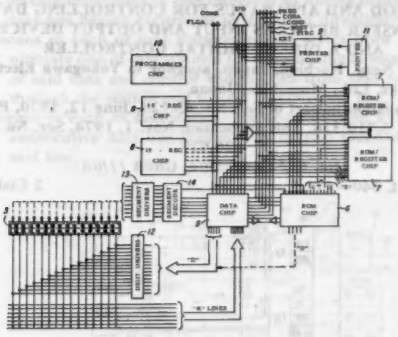
a reset signal for the set flip-flop corresponding to said selected output register.

4,004,280

CALCULATOR DATA STORAGE SYSTEM

Jerry L. Vandierendonck, Santa Cruz, Calif., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 368,780, June 11, 1973. This application July 7, 1975, Ser. No. 593,594
Int. Cl.[2] G06F *13/00*
U.S. Cl. 340—172.5 4 Claims



1. An electronic calculator system of the type implemented on a plurality of semiconductor chips, including a plurality of separate data registers for storing in bit-parallel, digit-serial format a plurality of multi-digit words of coded information, primary timing means for producing timing signals for sequentially addressing the separate data registers one digit at a time from least to most significant digit, flag output means for providing status information relating to a calculator mode indication and an addressing indication, data input/output means for transmitting the multi-digit data words to and from the separate data registers, the calculator system further including at least one data register chip comprising:

a. a plurality of auxiliary registers for increasing the storage capacity for the multi-digit data words;

b. control logic means responsive to the status information from the flag output means for generating first and second operations signals and a synchronization signal;

c. storage means coupled to the data input/output means for storing a first multi-digit data word transmitted from the separate data registers, the first data word comprising an input/output operation command portion and a register select portion for selecting a particular register of the plurality of auxiliary registers to be addressed;

d. selection means operatively connected to the storage means and responsive to the first data word for selecting a particular one of the separate storage registers and operatively connected to the control logic means and responsive to the first and second operation signals for data input or output, respectively;

e. register timing means for providing timing signals corresponding to the timing signals of the primary timing means for addressing the auxiliary registers corresponding to the timing signals of the timing means, in response to the synchronization signal from the control logic means; and

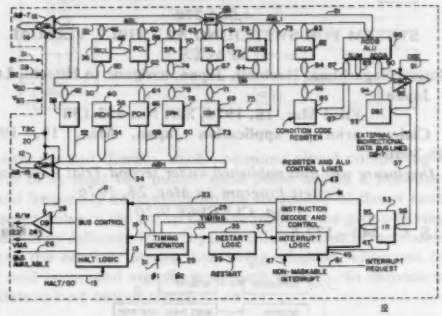
f. data routing means connected to the data input/output means for transmission of data to and from a selected one of the plurality of auxiliary registers, through the storage means.

4,004,281

MICROPROCESSOR CHIP REGISTER BUS STRUCTURE

Thomas H. Bennett, Scottsdale; Anthony E. Kouvoussis, and Michael F. Wiles, both of Phoenix, all of Ariz., assignors to Motorola, Inc., Chicago, Ill.

Filed Oct. 30, 1974, Ser. No. 519,133
Int. Cl.[2] G06F *9/00*
U.S. Cl. 340—172.5 6 Claims



1. In a microprocessor including an address bus coupled to an address output circuit and a data bus coupled to a data input-output circuit, said microprocessor being suitable for executing a plurality of instructions stored in a memory in accordance with a plurality of machine cycles, each of said instructions including an operational code, circuitry comprising:

program register storage means coupled between said address bus and said data bus for storing an address of an operational code of a first instruction during a first machine cycle; said program register storage means including first means for transferring said address of said operational code to said address bus during said first machine cycle;

incrementor means coupled between said address bus and said data bus for receiving an address from said data bus or said address bus in response to one of said instructions;

said incrementor means including second means for transferring said address to said address bus during said first machine cycle in response to one of said instructions;

said incrementor means also including third means for incrementing said address during said first machine cycle;

said incrementor means also including fourth means for transferring said incremented address into said program register storage means during a second machine cycle;

transfer bus means coupled between said program register storage means and said incrementor means for effecting said transfer of said incremented address; and

control and timing circuitry coupled to said program register means and said incrementor means for effecting said first and second machine cycles.

4,004,282

CIRCUIT ARRANGEMENT FOR AN INTEGRATED DATA PROCESSING SYSTEM COMPOSED OF A SMALL NUMBER OF DIFFERENT CHIP TYPES WITH ALL CHIPS DIRECTLY CONNECTABLE TO A COMMON COLLECTING BUS

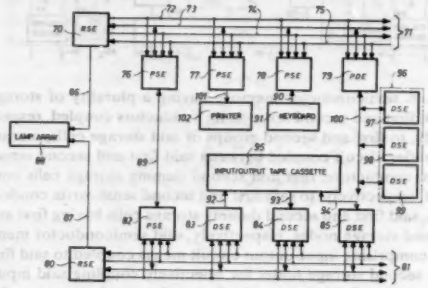
Gerald Weber, and Jürgen Sorgenfrei, both of Braunschweig, Germany, assignors to Olympia Werke AG, Wilhelmshaven, Germany

Filed Dec. 20, 1974, Ser. No. 535,088

Claims priority, application Germany, Dec. 22, 1973, 2364303

Int. Cl.² G06F 7/48, 13/00

U.S. Cl. 340—172.5 10 Claims



1. In a circuit arrangement for an integrated data processing system, which arrangement is composed of a plurality of integrated circuit chips each carrying a plurality of circuit components interconnected to define function blocks which include first, second and third address registers, at least one further address register, a status register, a calculating register, an arithmetic-logic linkage unit, an instruction control containing a data read-only memory, a readout memory constituting a source of microprogram instructions for controlling the sequence of operation of said circuit arrangement, a read/write random access memory, and peripheral interconnection channels, the arrangement further including a collecting bus connected between the chips for interconnecting their respective function blocks, the improvement wherein said arrangement includes two such chips, with a first one of said chips constituting an arithmetic and control unit and carrying the circuit components defining said first and second address registers, said status register, said calculating register, said arithmetic-logic linkage unit, said instruction control, said read/write random access memory connected to operate as a data store, and a first one of said peripheral channels connected for selectively effecting parallel transmission of information bytes into or out of said arithmetic and control unit in dependence on the operation being performed under control of the microprogram, said first chip further carrying conductors interconnecting said function blocks on said first chip, said conductors carried on said first chip including first conductor means interconnecting said first address register and said random access memory for enabling the memory locations of said random access memory to be addressed by the content of said first address register, second conductor means interconnecting said instruction control and said second address register for enabling said instruction control to be addressed by the content of said second address register, and third conductor means interconnecting said status register and said arithmetic-logic linkage unit for enabling said status register to store information produced by said linkage unit and determining a subsequent operating sequence of said circuit arrangement, and with a second one of said chips constituting a program storage unit and carrying the circuit components defining said third address register, said at least one further address register, said readout memory, and a second one of said peripheral channels connected for selectively effecting parallel transmission of information into or out of said program storage unit in dependence on the operation being performed under control of the microprogram, said second chip further carrying conductors interconnecting said function blocks on said second chip, said conductors carried on said second chip including fourth conductor means connecting said third address register to said bus for selectively setting the stages of said third address register in parallel or supplying counting pulses to said third address register to cause it to count through a succession of binary values, and fifth conductor means interconnecting said third and further address registers to form an address stack for intermediate storage of the previous content of said third register in said further register during execution of a subprogram jump by said circuit arrangement.

4,004,283

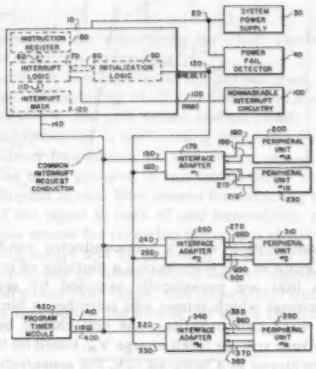
MULTIPLE INTERRUPT MICROPROCESSOR SYSTEM

Thomas H. Bennett; Earl F. Carlow, both of Scottsdale, Ariz.; Charles Peddle, Norristown, Pa., and Michael F. Wiles, Phoenix, Ariz., assignors to Motorola, Inc., Chicago, Ill.

Filed Oct. 30, 1974, Ser. No. 519,139

Int. Cl.² G06F 9/18

U.S. Cl. 340—172.5 5 Claims



1. In a digital system including a memory for storing instructions, a microprocessor for executing said stored instructions, a bidirectional data bus connected to said microprocessor, first and second peripheral units, a bidirectional peripheral data bus connected to said first and second peripheral units, and first and second interface adaptors connected between said bidirectional data bus and said bidirectional peripheral data bus for controlling transfer of data flow between said bidirectional data bus and said first and second peripheral units and generating interrupt request signals in response to interrupt requests from said first and second peripheral units, respectively, an interrupt system comprising:

an interrupt conductor for conducting said interrupt request signals connected to said microprocessor and said first and second interface adaptors;

a non-maskable interrupt conductor connected to said microprocessor;

interrupt signal generating means coupled to said non-maskable interrupt conductor for generating a priority interrupt signal on said non-maskable interrupt conductor;

interrupt logic means in said microprocessor coupled to said non-maskable interrupt conductor for causing said microprocessor to address a fixed location in said memory in response to a priority interrupt signal produced on said non-maskable interrupt conductor by one of said first and second interface adaptors, said fixed location containing an address of an interrupt routine; and

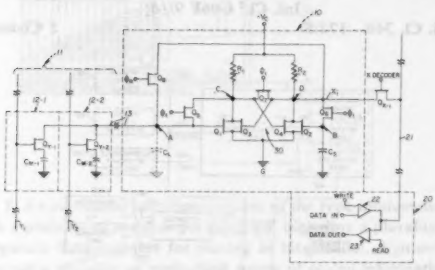
interrupt mask means in said microprocessor connected between said interrupt conductor and said interrupt logic means and coupled to said bidirectional data bus for storing digital information from said bidirectional data bus and enabling said interrupt logic means to cause said addressing of said fixed location conditionally upon said digital information in response to one of said interrupt request signals.

4,004,284

BINARY VOLTAGE-DIFFERENTIAL SENSING CIRCUITS, AND SENSE/REFRESH AMPLIFIER CIRCUITS FOR RANDOM-ACCESS MEMORIES

Richard H. Heeren, Palatine, Ill., assignor to Teletype Corporation, Skokie, Ill.

Filed Mar. 5, 1975, Ser. No. 555,482
Int. Cl.² G11C 7/06, 11/24
U.S. Cl. 340—173 DR **7 Claims**



1. In combination with a semiconductor random-access memory circuit of the type having a plurality of memory cell capacitors that are periodically sampled by sense/refresh amplifier circuit which senses and refreshes a binary charge stored on each cell capacitor, the cell charge being either essentially zero volts or a cell charge V_M, based on the value of binary data stored in a selected cell, the sense/refresh amplifier circuit including a pair of flip-flop circuit nodes, means for equalizing the potential at said nodes prior to a cycle time t_1, and flip-flop means for sensing a difference in potential between said nodes after time t_1 and for generating a binary output voltage at one of said nodes having one of two levels set in accordance with the charge stored on the selected cell capacitor, an improved sense/refresh amplifier circuit characterized by:

a. a pair of matched, input field-effect transistors having their source/drain impedances connected respectively between the flip-flop circuit nodes and circuit ground;

b. a pair of input circuit nodes connected respectively to the gates of the input transistors and normally not connected to the flip-flop circuit nodes during the sensing operation;

c. means for presetting both of the input nodes at a common initial reference potential V_R prior to cycle time t_1, V_R being approximately midway between V_M and zero volts and being set so that the input transistors both turn ON and operate as variable resistors, the conductivity through each of which varies with applied gate voltage above or below V_R; and

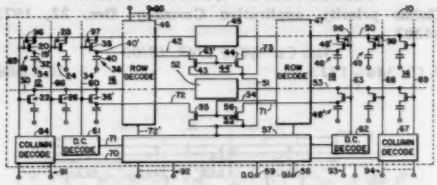
d. means for connecting the selected memory cell capacitor to one of the input nodes after time t_1 so that the conductivity through the corresponding input transis for having its gate connected to that input node varies in accordance with the cell charge to vary the potential at the corresponding flip-flop circuit node so as to trigger the flip-flop means to produce a binary output voltage in accordance with the charge stored on the selected cell capacitor.

4,004,285

READ-WRITE CIRCUITRY FOR ONE TRANSISTOR PER BIT RANDOM ACCESS MEMORY

Alan Richard Bormann, Tempe, Ariz., and Robert Tapei Yu, Sunnyvale, Calif., assignors to Motorola, Inc., Chicago, Ill.

Filed June 30, 1975, Ser. No. 591,676
Int. Cl.² G11C 11/40
U.S. Cl. 340—173 CA **12 Claims**



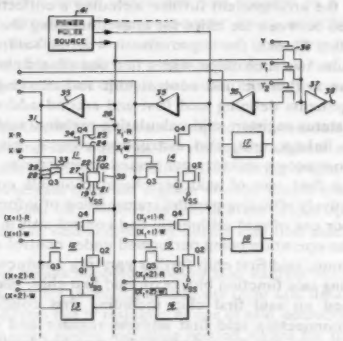
1. A semiconductor memory having a plurality of storage cells, first and second sense-write conductors coupled, respectively, to first and second groups of said storage cells, a sense amplifier circuit coupled between said first and second sense-write conductors, first and second dummy storage cells coupled, respectively, to said first and second sense-write conductors, said first and second dummy storage cells having first and second storage nodes, respectively, said semiconductor memory comprising input-output circuit means coupled to said first and second storage nodes for selectively coupling said input-output circuit means to said first and second storage nodes during a portion of a read operation or a write operation.

4,004,286

PROGRAMMABLE RANDOM ACCESS MEMORY (PRAM) INTEGRATED CIRCUIT MEMORY DEVICE

Dale A. Mrazek, Los Altos Hills, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Jan. 17, 1975, Ser. No. 541,781
Int. Cl.² G11C 11/40
U.S. Cl. 340—173 R **2 Claims**



2. An integrated circuit memory cell structure comprising:

a write select transistor having a gate for coupling to a write select input, a source for coupling to the input of said cell, and a drain,

a read select transistor having a gate coupling to a read select input, a source, and a drain for coupling to the output of said cell,

a random access memory transistor having a gate coupled to the drain of said write select transistor, a source for coupling to a source of potential, and

a drain coupled to the source of said read select transistor, and a read only memory transistor having a floating gate, a source coupled to the source of said random access mem-

ory transistor, and a drain coupled to the drain of said random access memory transistor.

4,004,287

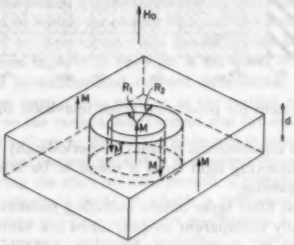
HOLLOW MAGNETIC DOMAIN RECORDING DEVICE

Frederik Ate De Jonge; Willem Frederik Druijvesteijn, and Antonius Gerardus Hendrikus Verhulst, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 345,663, March 28, 1973, abandoned, which is a continuation of Ser. No. 165,025, July 22, 1971, abandoned. This application June 30, 1975, Ser. No. 591,705

Int. Cl.² G11C *11/14*

U.S. Cl. 340—174 TF **8 Claims**



1. A recording device comprising a recording medium having a thin layer of a magnetizable material having an easily magnetizable direction which is approximately at right angles to a surface of said layer, and means for producing magnetic domains therein, said medium containing magnetic domains at least some of which have a hollow domain therein, said hollow domain being defined as a region within said magnetic domain in which the direction of the magnetization is directed opposite to said magnetic domain but the same to an external magnetic field, said medium further containing impurities for providing said medium with lattice defects so that variation of said external magnetic field is increased.

4,004,288

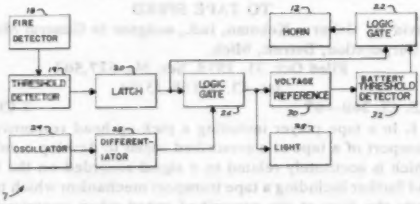
BATTERY OPERATED FIRE DETECTION UNIT

William Webb, Jr., Denver, Colo., assignor to Unitec, Inc., Denver, Colo.

Filed Jan. 29, 1975, Ser. No. 545,251

Int. Cl.² G08B *17/10*

U.S. Cl. 340—237 S **11 Claims**



1. A fire detection unit, comprising: battery means; ionization detection means connected with said battery means and producing an output indicative of sensed smoke; threshold detection means for receiving the output from said ionization detection means and producing an output when said output from said ionization detection means exceeds a predetermined value; oscillator means; logic gate means connected to receive the output from said oscillator means and the output from said threshold detection means; light means connected to said logic gate means whereby said light means is caused to be periodically energized to indicate proper operation of said unit and continuously energized when an output is produced by said threshold detection means; and alarm means connected to said threshold detection means and connected with said battery means, said alarm means being operable independent of said oscillator means so as to be responsive to an output from said threshold detection means to provide a continuous alarm indication.

4,004,289

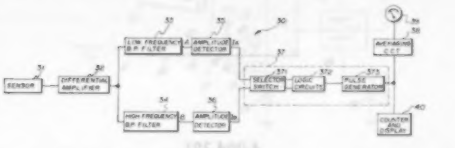
ACOUSTIC GRAIN FLOW RATE MONITOR

Thomas G. Kirk, Saskatoon, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Canada

Filed Dec. 17, 1975, Ser. No. 641,663

Int. Cl.² G08B *21/00*

U.S. Cl. 340—267 R **8 Claims**



1. An apparatus for monitoring the chaff ejected from a thresher for seed loss comprising:

acousto-electric sensing means for providing an output in response to impinging chaff and seed when mounted on the thresher in the path of the ejected chaff;

filter means coupled to said sensing means for passing predetermined frequencies of said sensor signal, said frequencies being grouped in two bandwidths;

means coupled to said filter means for detecting the amplitude of the signal in each of said bandwidths; and

comparator means for receiving the output signals from the detecting means and for providing an output signal when the amplitudes of said detected output signals are in a predetermined ratio range, said comparator output signal being a function of the number of seeds ejected with the chaff.

4,004,290

METHOD AND APPARATUS FOR JUDGING PSYCHOSOMATIC CONDITION OF THE DRIVER IN MOTOR VEHICLE

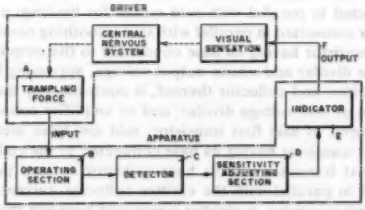
Kazuo Kobayashi; Seiichi Sugiura, and Yoshimasa Oosumi, all of Shizuoka, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Aug. 19, 1975, Ser. No. 605,961

Claims priority, application Japan, Aug. 28, 1974, 49-98499; Mar. 5, 1975, 50-26738

Int. Cl.² B60K *28/00*; B60T *7/14*

U.S. Cl. 340—279 **13 Claims**



1. An apparatus for judging the psychosomatic condition of the driver in a motor vehicle by requiring the driver to per-

form the stationary adjusting task of maintaining his foot pressure at a predetermined fixed level for a predetermined time interval, comprising a pedal in the driver's compartment of the motor vehicle, a pressure sensitive detector coupled to said pedal and operative to produce an electrical signal representative of the pedal force being exerted by the driver, an indicator visible to the driver in said driver's compartment and responsive to said signal for providing an indication of the pedal force being exerted by the driver, said indicator including a scale having a fixed indication thereon visible to the driver and representative of the predetermined fixed level of pedal force which is to be maintained by the driver, and a processing circuit including timer means defining said predetermined time interval, said processing circuit further including means for comparing the output signal of the detector with a preset fixed reference value during said predetermined time interval.

4,004,291

ELECTRIC SIGNAL TRANSMITTER, PREFERABLY FOR ALARM SYSTEM

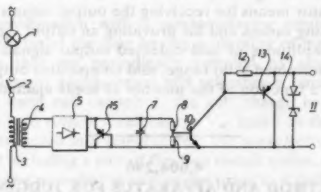
Heinz Dieter Lutzenkirchen, Trangsund, Sweden, assignor to Trapark i Kiruna Aktiebolag, Kiruna, Sweden

Filed Mar. 28, 1974, Ser. No. 455,953

Claims priority, application Sweden, Mar. 28, 1973, 7304392

Int. Cl.² H04M *11/04*

U.S. Cl. 340—310 R **4 Claims**



1. For use in supervisory alarm system, a signal transmitter means for producing a D.C. output signal whenever a manually actuatable switch, which is connected in series with a current consuming device across an A.C. power source, is closed with the voltage of said D.C. output signal being less than that of said power source, said signal transmitter means comprising: a transformer having its primary winding connected in series with said switch, said current consuming device and said A.C. power source; a rectifier connected to the secondary winding of said transformer; means for limiting the D.C. output voltage from said rectifier connected in shunt across the output of said rectifier; a smoothing condenser connected in parallel with said means for limiting; a voltage divider connected in parallel with said smoothing condenser; a first transistor having its base connected to the output of said voltage divider and whose output voltage, appearing between the emitter and collector thereof, is controlled by the output voltage of said voltage divider; and an amplifier connected to the output of said first transistor, said amplifier including a further transistor having its base connected to the collector of said first transistor and its base collector current path connected in parallel with the emitter collector current path of said first transistor, a resistor connected between the emitter and base of said further transistor, and a limiter chain for providing transient protection, and including a pair of Zener diodes connected in series opposition, connected between the emitter and collector of said further transistor.

4,004,292

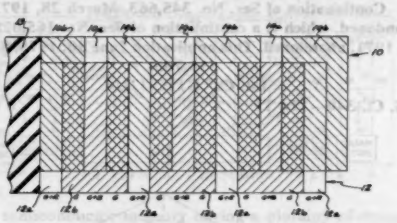
SYSTEM FOR PRODUCING CHROMA SIGNALS

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Kenneth H. Vorhaben, Houston, and Phillip C. Lipoma, Dickinson, both of Tex.

Filed Sept. 12, 1975, Ser. No. 612,967

Int. Cl.² H04N *9/07*

U.S. Cl. 358—44 **6 Claims**



3. A system for producing color television signals comprising:

a. filter combination means, for periodically optically color multiplexing light from a scene to be televised, further comprising:

i. first filter layer means including parallel periodic optically transparent stripes, all of the same width, interleaved among periodic first dichroic filter stripes opaque to a first primary color, such that said first dichroic filter stripes are each three times as wide as each said optically transparent stripes of said first filter layer means; and

ii. second filter layer means including parallel periodic optically transparent stripes interleaved among periodic second dichroic filter stripes opaque to a second primary color, such that said second dichroic filter stripes are each three times as wide as each said optically transparent stripes of said second filter layer means, and equal in width to each of said first dichroic filter stripes, to produce the multiplex sequence in the light transmitted by said filter combination as: third and second primary colors, third primary color, third and first primary colors, third primary color; and

b. scanning television image pickup means for converting said color multiplexed light into an electronic chroma carrier signal time division multiplexed in the same color sequence as said optical color multiplexing of said light from said scene to be televised.

4,004,293

TAPE PLAYER PREAMPLIFIER CIRCUIT RESPONSIVE TO TAPE SPEED

David W. Osburn, Kokomo, Ind., assignor to General Motors Corporation, Detroit, Mich.

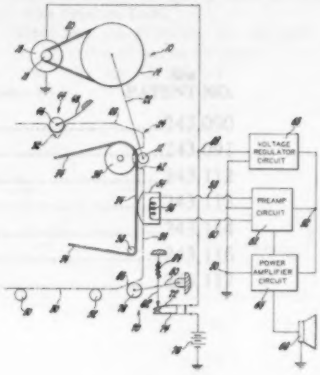
Filed Oct. 31, 1975, Ser. No. 627,503

Int. Cl.² G11B *15/04*

U.S. Cl. 360—67 **3 Claims**

1. In a tape player including a pick-up head responsive to transport of a tape at a prescribed speed to develop a voltage which is accurately related to a signal recorded on the tape, and further including a tape transport mechanism which transports the tape at the prescribed speed when energized but which exhibits an inertia such that following energization of the tape transport mechanism the tape does not reach the prescribed speed until after the expiration of a start-up time period during which the voltage developed by the pick-up head is distortedly related to the signal recorded on the tape; a preamplifier circuit comprising: an input node; a first current generator for generating a first input bias current which is one of applied or withdrawn at the input node, the first current generator including a control node through which the first input bias current is directed; a second current generator for

generating a second input bias current which is the other of applied or withdrawn at the input node, the second current generator including the pick-up head for effectively impressing upon the second input bias current an input signal current which corresponds to the voltage developed by the pick-up head such that the input signal current is distorted during the start-up time period; an output node; an amplifier block shiftable between an active state and an inactive state, the amplifier block operating in the active state to apply an output bias current to the output node which is an amplification of the difference between the first and second input bias currents and also operating in the active state to apply an output signal current to the output node which is an amplification of the input signal current such that the output signal current is distorted during the start-up time period, the amplifier block shifting to the active state only when the difference between the first and second input bias currents is one of greater or less than a predetermined current differential and shifting to the inactive state in which no output bias current and no output signal current are developed when the difference between the first and second input bias currents is the other of greater or less than the predetermined current differential; a load for developing an output bias voltage at the output node which corresponds to the output bias current and for developing an output signal voltage at the output node which corresponds to the output signal current such that the output signal voltage is distorted during the start-up time period; a voltage generator including a reference node at which a reference voltage is established when the tape transport mechanism is energized; and a bias current controller including a voltage-follower transistor operable when turned on to develop a bias control current between the output node and the control node at which it is algebraically summed with the first input bias current such that the difference between the first and second input bias currents at the input node is made the one of greater or less than the predetermined current differential thereby shifting the amplifier block to the active state to develop an output bias current at the output node which increases until the output signal voltage developed at the output node is raised to substantially the reference voltage established at the



reference node; the bias current controller further including time delay means for preventing the voltage-follower transistor from turning on until after the expiration of the start-up time period of the tape transport mechanism thereby to avoid the production of a distorted output signal voltage at the output node.

DESIGN PATENTS

GRANTED JANUARY 18, 1977

ERRATA

For CLASS	See PATENT NO.
026–001 B	243,090
026–014 A	243,091
011–152	243,112
011–156	243,113
011–023	243,114
015–104	243,116
015–127	243,117

DESIGN PATENTS

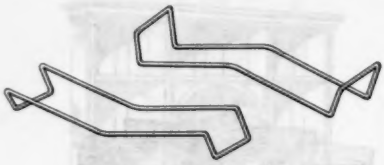
GRANTED JANUARY 18, 1977

ERRATA

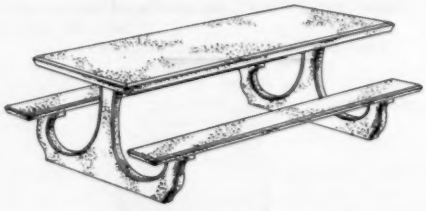
Pat. CLASS	Pat. PATENT NO.
026-001 B	243,000
026-014 A	243,091
011-172	243,112
011-156	243,113
011-022	243,114
013-104	243,116
013-127	243,117

JANUARY 18, 1977

243,042
INVERTIBLE BOOKRACK
Edward G. Dorn, 145 S. Belle Ave., Palatine, Ill. 60667
Filed Apr. 10, 1975, Ser. No. 566,696
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—3



243,043
PICNIC TABLE
Albert R. Rogers, 700 Newton, Kansas City, Mo. 64125
Filed Aug. 14, 1975, Ser. No. 604,826
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—45

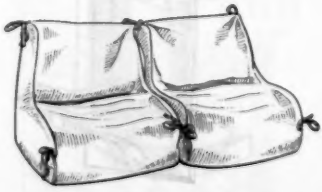


243,044
HANGING CHAIR
Richard D. Pathman, 1052 Sanchez St., San Francisco, Calif. 94114
Filed May 14, 1975, Ser. No. 577,478
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—47

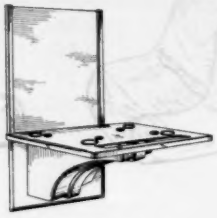
243,045
CHAIR
Rodney R. Haynes, Sr., Richmond, Va., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Aug. 14, 1975, Ser. No. 604,580
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—47

243,046
LOUNGE CHAIR
Jerry Johnson, Rancho Cuerdo - Box 50, Potrero, Calif. 92063
Filed Sept. 18, 1975, Ser. No. 614,698
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—56

243,047
SETTEE
Rodney R. Haynes, Sr., Richmond, Va., assignor to Dart Industries, Inc., Los Angeles, Calif.
Filed Aug. 14, 1975, Ser. No. 604,581
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—61



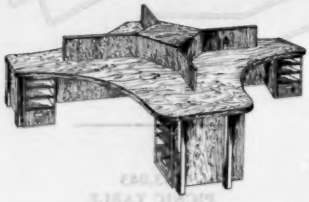
243,048
PEGBOARD MOUNTED SUPPORT FOR DISPLAYING POWER TOOLS
Terrance Neil Touchett, Batavia, and William E. Kotzenberg, Geneva, both of Ill., assignors to McGraw-Edison Company, Elgin, Ill.
Division of Ser. No. 433,704, Jan. 16, 1974, Pat. No. Des. 238,229.
This application May 19, 1975, Ser. No. 579,299
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—132



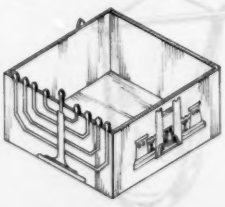
243,049
PORTABLE SHELF FOR A TELEPHONE OR SIMILAR ARTICLE
Harold L. Roberts, 7419 McWhorter Place, Annandale, Va. 22003
Filed Apr. 3, 1975, Ser. No. 565,018
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—136

243,050
PEGBOARD MOUNTED SUPPORT FOR DISPLAYING POWER TOOLS
Terrance Neil Touchett, Batavia, and William E. Kotzenberg, Geneva, both of Ill., assignors to McGraw-Edison Company, Elgin, Ill.
Division of Ser. No. 433, 704, Jan. 16, 1974, Pat. No. Des. 238,229.
This application May 19, 1975, Ser. No. 579,298
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—136

243,051
MULTIPLE STATION DESK
Ivan F. Goulooze, 3407 3 Mile Road, NW., Grand Rapids, Mich. 49504
Division of Ser. No. 451,963, Mar. 18, 1974, Pat. No. Des. 238,841. This application Dec. 4, 1975, Ser. No. 637,733
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—146



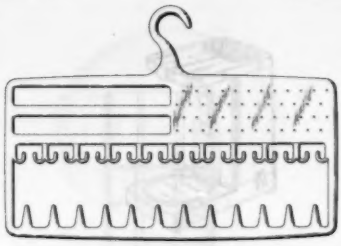
243,052
"CHANUKAH" CHEST
Howard L. Green, 5103 Foxcroft, Midland, Mich. 48640
Filed Nov. 22, 1974, Ser. No. 526,172
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—153



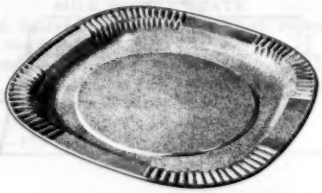
243,053
BOOKCASE OR THE LIKE
Joseph E. Adkinson, 3807 Leland St., Chevy Chase, Md. 20015
Filed Apr. 23, 1974, Ser. No. 463,289
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—161

243,054
BATHTUB TREAD
Thomas J. Nelson, 3015 Theresa St. No. 10, Long Beach, Calif. 90814
Division of Ser. No. 398,008, Sept. 17, 1973, Pat. No. Des. 239,807.
This application Sept. 2, 1975, Ser. No. 609,548
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—211

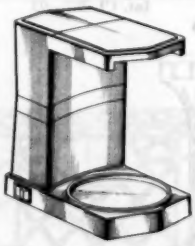
243,055
JEWELRY HANGER
Annette Blumberg, 26 Lyon St., Apt. 11, Pawtucket, R.I. 02860
Filed Dec. 31, 1975, Ser. No. 645,828
Term of patent 14 years
Int. Cl. D6—*08, 04*
U.S. Cl. D6—247



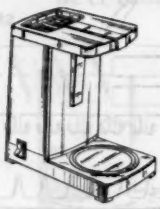
243,056
PLATE
Karl Gosta Bertil Andersson, Halmstad, Sweden, assignor to Duni Bila AB, Halmstad, Sweden
Division of Ser. No. 439,121, Feb. 4, 1974, Pat. No. Des. 239,686.
This application May 14, 1975, Ser. No. 577,228
Claims priority, application Sweden, Aug. 6, 1973, 731430; Aug. 6, 1973, 731431
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—1



243,057
COFFEEMAKER
David L. Painter, Glenview, Ill., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed June 6, 1975, Ser. No. 584,676
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—41

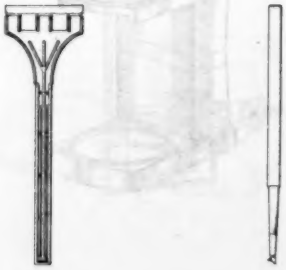


243,058
COFFEEMAKER
David L. Painter, Glenview, Ill., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed June 6, 1975, Ser. No. 584,677
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—41

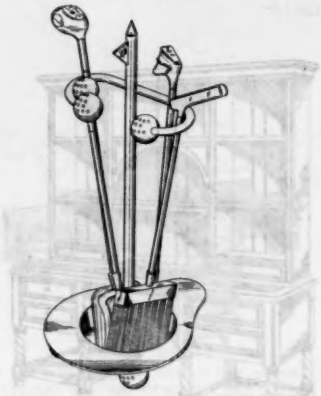


243,059
COMBINED ELECTRIC ROASTER AND BUTTERER FOR CORN
Fredrick Hoffschneider, 341 W. Colorado Ave., Grand Junction, Colo. 81501; Robert L. Hoffschneider, 2635 S. Eaton Place, Lakewood, Colo. 80227, and Richard A. Hoffschneider, 4202 S. Vrain, Denver, Colo. 80236
Filed Mar. 25, 1975, Ser. No. 561,840
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—97

243,060
SCRAPER
Joseph A. Graham; Reginald M. Stephenson, and Donald D. Dewar, all of Winnipeg, Canada, assignors to Atlas-Graham Industries Company Ltd., Winnipeg, Canada
Filed Sept. 9, 1975, Ser. No. 611,661
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—184

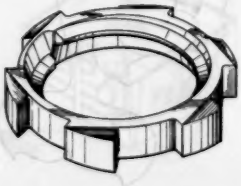


243,061
SET OF FIREPLACE TOOLS AND STAND THEREFOR
James M. Coupe, 11932 Armitage, Grandview, Mo. 64130
Filed July 28, 1975, Ser. No. 600,355
Term of patent 14 years
Int. Cl. D7—*08*
U.S. Cl. D7—206



243,062
GARDEN HOSE AND NOZZLE CONNECTOR
James T. Malloy, 16761 Marie Lane, Huntington Beach, Calif. 92647
Filed Aug. 7, 1975, Ser. No. 602,818
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—259

243,063
LOCKNUT
Thomas Mooney, Mount Sinai, N.Y., assignor to I-T-E Imperial Corporation, East Farmingdale, N.Y.
Filed Aug. 15, 1975, Ser. No. 604,871
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—274

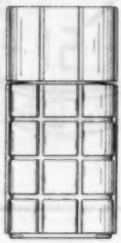


243,064
BOTTLE
Everett C. Beeman, Wallingford, Conn., and Richard C. Speak, Fullerton, Calif., assignors to United States Borax & Chemical Corporation, Los Angeles, Calif.
Filed May 6, 1975, Ser. No. 575,108
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—137

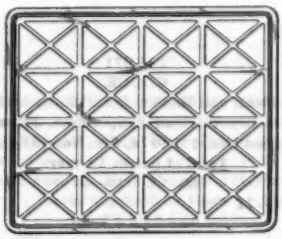
243,065
JAR
Stanley Herbert Picker, Kingston Hill, England, assignor to Mary Quant Cosmetics Limited, England
Filed Sept. 24, 1973, Ser. No. 399,872
Claims priority, application United Kingdom, Mar. 30, 1973, 961979/73
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—164

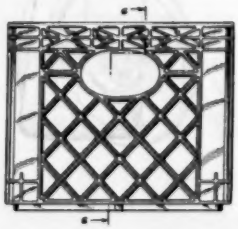
243,066
COMBINED CAP AND CONTAINER
Milton J. Halsted, Orange, and David Y. Muramatsu, Santa Ana, both of Calif., assignors to Wampole Limited, Perth, Ontario, Canada
Filed Apr. 23, 1973, Ser. No. 353,249
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—168

243,067
COMBINED BOTTLE AND CAP
Bernard A. Mitchell, 1000 N. Lake Shore Drive, Chicago, Ill. 60611
Filed Aug. 20, 1975, Ser. No. 605,975
Term of patent 14 years
Int. Cl. D9—*02*
U.S. Cl. D9—168



243,068
MILK BOTTLE CRATE
Ralph Verni, Baldwin, N.Y., assignor to Kingly Products Corporation, North Bellmore, N.Y.
Continuation-in-part of Ser. No. 443,007, Feb. 15, 1974, abandoned. This application July 16, 1975, Ser. No. 596,436
Term of patent 14 years
Int. Cl. D9—*04*
U.S. Cl. D9—177





243,069

DISPLAY BOX FOR MISCELLANEOUS GOODS

Norbert Francis Igelman, 37, rue de Marnes, 92 410 Ville D'Avray, France

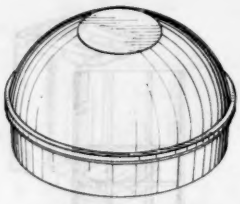
Filed Jan. 7, 1974, Ser. No. 431,133

Claims priority, application France, July 9, 1973, 73.1166

Term of patent 3½ years

Int. Cl. D9—*03*

U.S. Cl. D9—222



243,070

COMBINED CLOSURE AND SUPPORT FOR A CONTAINER

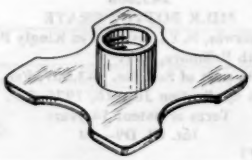
Alan J. Burgheimer, 29 Greenhaven Road, Rye, N.Y. 10580, and George J. Franks, 10 Crabtree Lane, Roslyn, N.Y. 11576

Filed Nov. 25, 1974, Ser. No. 527,178

Term of patent 14 years

Int. Cl. D9—*07*

U.S. Cl. D9—261



243,071

CLOCK

Ellworth R. Danz, and Roman J. Szalek, both of LaSalle, Ill., assignors to General Time Corporation, Thomaston, Conn.

Filed Dec. 17, 1974, Ser. No. 533,664

Term of patent 14 years

Int. Cl. D10—*01*

U.S. Cl. D10—22

243,072

COMPASS

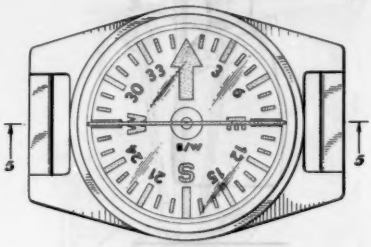
Dominic J. Spinosa, and John Robert Ryan, both of Wantagh, N.Y., assignors to East/West Industries, Inc., Farmingdale, N.Y.

Filed July 30, 1975, Ser. No. 600,504

Term of patent 14 years

Int. Cl. D10—*04*

U.S. Cl. D10—68



243,073

TRAFFIC CHANNELIZATION DRUM OR THE LIKE

Jack H. Kulp, San Juan Capistrano, Calif., and James M. Florsheim, Northbrook, Ill., assignors to Royal Industries, Inc., Pasadena, Calif.

Filed Apr. 19, 1976, Ser. No. 678,308

Term of patent 14 years

Int. Cl. D10—*06*

U.S. Cl. D10—109

243,074

TRAFFIC CHANNELIZATION DRUM OR THE LIKE

Jack H. Kulp, San Juan Capistrano, Calif., and James M. Florsheim, Northbrook, Ill., assignors to Royal Industries, Inc., Pasadena, Calif.

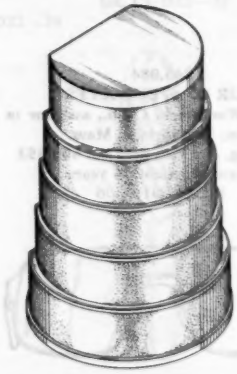
Filed Apr. 19, 1976, Ser. No. 678,309
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—109

243,075

TRAFFIC CHANNELIZATION DRUM OR THE LIKE

Jack H. Kulp, San Juan Capistrano, Calif., and James M. Florsheim, Northbrook, Ill., assignors to Royal Industries, Inc., Pasadena, Calif.

Filed Apr. 19, 1976, Ser. No. 678,310
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—109



243,076

ELECTROOPTIC TIMEPIECE FACE

Harwell B. Thompson; Milton B. Sheffield, both of Cheshire, and Raymond J. Grohoski, Watertown, all of Conn., assignors to Timex Corporation, Waterbury, Conn.

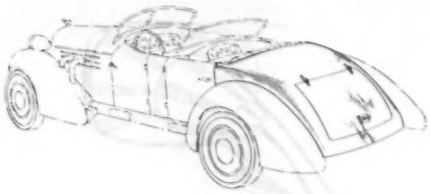
Filed June 11, 1975, Ser. No. 586,003
Term of patent 14 years
Int. Cl. D10—*07*
U.S. Cl. D10—126

243,077

TRUNK COMPARTMENT FOR AN AUTOMOBILE

Glenn A. Pray, 122 S. Elm Place, Broken Arrow, Okla. 74102

Filed May 23, 1975, Ser. No. 581,424
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—156



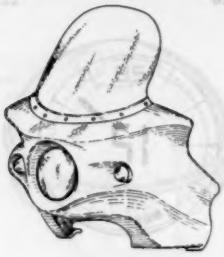
243,078

MOTOR VEHICLE STEERING WHEEL

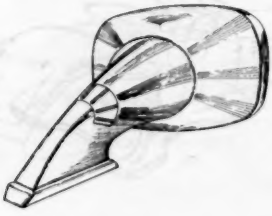
Peter O. Marker, 4508 Bates Drive, Yorba Linda, Calif. 92686, and Joseph F. King, 5507 Cochin Ave., Arcadia, Calif. 91006

Filed Apr. 25, 1975, Ser. No. 571,756
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—176

243,079
MOTORCYCLE FAIRING
Vincent Jaeke, 1240 Harland St., Denver, Colo. 80214
Filed Aug. 20, 1975, Ser. No. 606,282
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—182

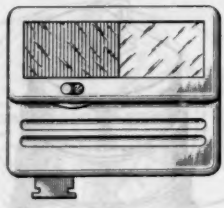


243,080
REAR VIEW MIRROR
Yorck Talbot, Ebersstrasse 80, 1 West Berlin 62, Germany
Filed Apr. 9, 1975, Ser. No. 566,333
Claims priority, application Germany, Nov. 22, 1974, 4088
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—187



243,081
REAR VIEW MIRROR
Yorck Talbot, Ebersstrasse 80, 1 West Berlin 62, Germany
Filed Apr. 9, 1975, Ser. No. 566,332
Claims priority, application Germany, Nov. 22, 1974, 4088
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—189

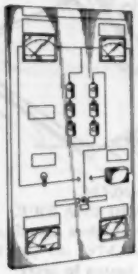
243,082
ELECTRONIC FLASH UNIT
Jochen Kramer, Wolfsburg, and Claus Prochnow, Braunschweig, both of Germany, assignors to Rollei-Werke Franke & Heidecke
Division of Ser. No. 501,099, Aug. 27, 1974. This application Oct. 14, 1975, Ser. No. 621,737
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D16—42



243,083
PAIR OF SPECTACLES
Anthony Shindler, Brookline, Mass., assignor to American Optical Corporation, Southbridge, Mass.
Filed Feb. 9, 1976, Ser. No. 656,454
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

243,084
PAIR OF SPECTACLES
David W. Johnsen, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.
Filed Aug. 4, 1975, Ser. No. 601,853
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—77

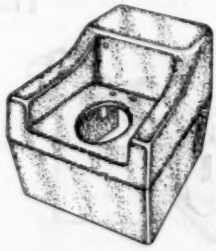
243,085
BATTERY CHARGING CYCLE EDUCATIONAL BOARD
Jack N. Holcomb, P.O. Box 23130, Fort Lauderdale, Fla. 33307
Filed Oct. 15, 1974, Ser. No. 514,902
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—64



243,086
FISHING LURE
Carl Nothdurft, 22412 Lavon, St. Clair Shores, Mich. 48656
Filed Sept. 3, 1975, Ser. No. 609,971
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—29

243,087
PUMP HANDLE
William J. Yeager, Alden, N.Y., assignor to R. E. Chapin Manufacturing Works, Inc., Batavia, N.Y.
Filed May 30, 1974, Ser. No. 474,367
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—1 A

243,088
WATER CLOSET COVER
Nancy Mardesich Halvorsen, 215 Alhambra Ave., Santa Cruz, Calif. 95060
Filed Oct. 25, 1974, Ser. No. 517,956
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 6, 1976
Term of patent 7 years
Int. Cl. D23—*02*
U.S. Cl. D23—71



243,089

WATER CLOSET COVER

Nancy Mardesich Halvorsen, 215 Alhambra Ave., Santa Cruz, Calif. 95060

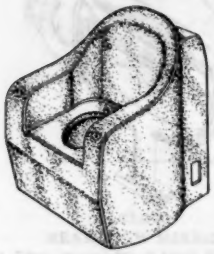
Filed Oct. 25, 1974, Ser. No. 517,957

Disclosure was also published under second Trial Voluntary Protest Program on Apr. 6, 1976

Term of patent 7 years

Int. Cl. D23—*01*

U.S. Cl. D23—71



243,090

CORD CONNECTOR

George J. Lawrence, North Kingstown, and Lawrence P. Mellyn, Glocester, both of R.I., assignors to General Electric Company, N.Y.

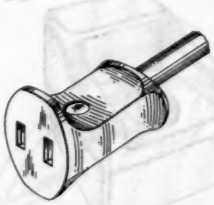
Filed Jan. 30, 1975, Ser. No. 545,265

Disclosure was also published under second Trial Voluntary Protest Program on Apr. 13, 1976

Term of patent 14 years

Int. Cl. D13—*03*

U.S. Cl. D26—1 B



243,091

TELEPHONE ACCESSORY

Carl-Arne Breger, Stockholm, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Aug. 16, 1974, Ser. No. 497,896

Claims priority, application Sweden, Mar. 1, 1974, 74384

Disclosure was also published under second Trial Voluntary Protest Program on Apr. 6, 1976

Term of patent 14 years

Int. Cl. D14—*03*

U.S. Cl. D26—14 A

243,092

FREESTANDING FIREPLACE

Santosh D. Sheth, Huntington, Ind., assignor to American Standard Inc.

Filed Nov. 20, 1975, Ser. No. 633,755

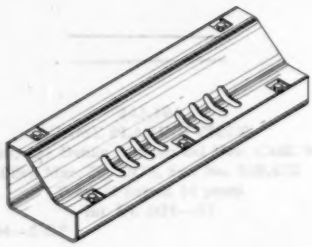
Term of patent 14 years

Int. Cl. D23—*03*

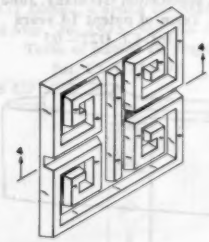
U.S. Cl. D23—97

243,093
HANDRAIL FOR VEHICLES
Robert L. Reynolds, 7931 Orangewood, Stanton, Calif. 90680
Filed Aug. 21, 1975, Ser. No. 606,426
Term of patent 14 years
Int. Cl. D25—*02*; D12—*99*
U.S. Cl. D25—38

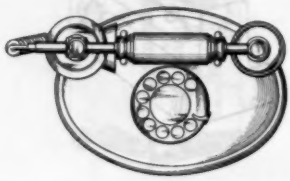
243,094
CURB AND DRAIN UNIT
Sinzo Ito, Tokyo, Japan, assignor to Sanken Steel Co. Ltd.
Filed July 10, 1974, Ser. No. 487,363
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—73

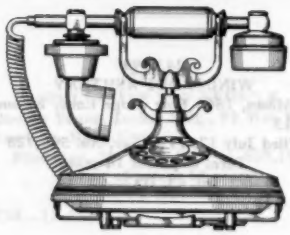


243,095
DECORATIVE PLASTIC PANEL FOR A DOOR SURFACE
Warren G. Stichtenoth, Cincinnati, Ohio, assignor to American Standard Inc.
Filed Dec. 16, 1974, Ser. No. 533,411
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—80

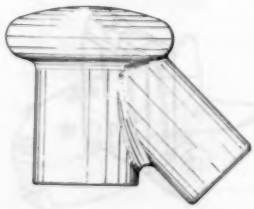


243,096
TELEPHONE
George D. Perkins, Laguna Niguel, Calif., assignor to American Telecommunications Corporation
Filed Aug. 12, 1974, Ser. No. 496,378
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 A

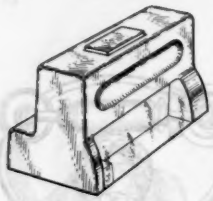




243,097
SPARK PLUG COVER
Antonio Gomes, Jr., East Longmeadow, Mass., assignor to R. E. Phelon Company, Inc., East Longmeadow, Mass.
Filed May 28, 1975, Ser. No. 581,647
Term of patent 14 years
Int. Cl. D15—*01*
U.S. Cl. D26—1 J

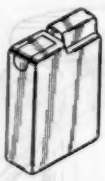


243,098
HAND HELD ELECTRONIC SCANNING CAMERA PROBE
Morris A. Kohn, San Mateo, Calif., assignor to Datacopy Corporation, Palo Alto, Calif.
Filed June 30, 1975, Ser. No. 591,356
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C

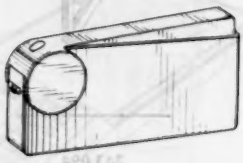


243,099
WINDPROOF ASHTRAY
John Philip Moses, 1865 Pine Ridge Lane, Bloomfield Hills, Mich. 48013
Filed July 17, 1975, Ser. No. 596,720
Term of patent 14 years
Int. Cl. D27—*03*
U.S. Cl. D27—10

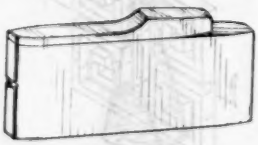
243,100
LIGHTER
Robert Hocq, Boulogne, France, assignor to Societe Franco-Hispano-Americaine (Francispam), Saint-Gratien, France
Filed Mar. 20, 1975, Ser. No. 560,173
Claims priority, application France, Sept. 24, 1974, 74.446
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42



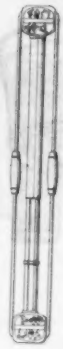
243,101
LIGHTER
Bernd Figur, Nieder-Roden, Germany, assignor to Rowenta-Werke, GmbH, Offenbach (Main), Germany
Filed Nov. 24, 1975, Ser. No. 634,979
Claims priority, application Germany, May 30, 1975, 59869
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42



243,102
LIGHTER
Franz Alban Stuetzer, Muhlheim (Main), and Bernd Figur, Nieder-Roden, both of Germany, assignors to Rowenta-Werke, GmbH, Offenbach (Main), Germany
Filed Dec. 8, 1975, Ser. No. 638,321
Claims priority, application Germany, June 25, 1974, 59876
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42



243,103
PHYSICAL EXERCISER
Arthur Hale, London, England, assignor to Edito-Service S.A., Geneva, Switzerland
Filed Nov. 4, 1974, Ser. No. 520,886
Claims priority, application United Kingdom, May 4, 1974, 966503/74
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 K



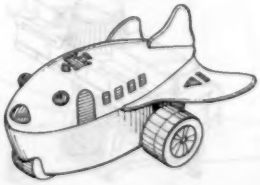
243,104
GAME PLAYING PIECE
Tim Radmall, 431 Dahlia, Corona del Mar, Calif. 92625
Filed Mar. 20, 1975, Ser. No. 560,472
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 GP

243,105
GAME PLAYING PIECE
Tim Radmall, 431 Dahlia, Corona del Mar, Calif. 92625
Filed Mar. 20, 1975, Ser. No. 560,473
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 GP

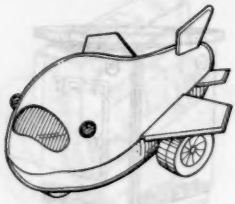
243,106
GAME CABINET
Regan L. Cheng, San Jose, Calif., assignor to Atari, Inc.
Filed Sept. 17, 1975, Ser. No. 614,015
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 J

243,107
SIMULATIVE TOY VEHICLE
Yim Hei Joseph Yeung, Joylite Bldg., 99 Wai Yip St., Kwun Tong, Kowloon, Hong Kong
Filed Apr. 18, 1975, Ser. No. 569,199
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AM

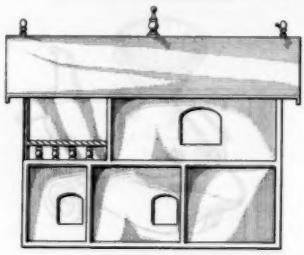
243,108
SIMULATIVE TOY VEHICLE
Yim Hei Joseph Yeung, Joylite Bldg., 99 Wai Yip St., Kwun Tong, Kowloon, Hong Kong
Filed Apr. 18, 1975, Ser. No. 569,197
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AM



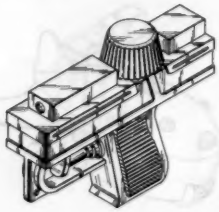
243,109
SIMULATIVE TOY VEHICLE
Yim Hei Joseph Yeung, Joylite Bldg., 99 Wai Yip St., Kwun Tong, Kowloon, Hong Kong
Filed Apr. 18, 1975, Ser. No. 569,198
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AM



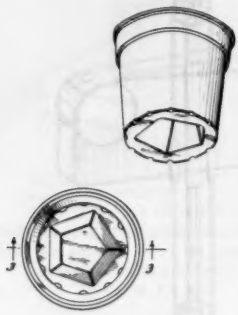
243,110
DOLL HOUSE
Roy V. Friesen, 925 E. 1700 South, Salt Lake City, Utah 84115
Filed Jan. 7, 1976, Ser. No. 647,219
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 LL



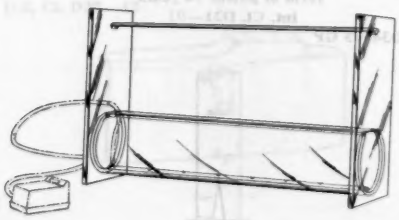
243,111
TOY WATER GUN
Francis M. L. Barthropp, West Vancouver, Canada, assignor to Barton of Canada Ltd., Burnaby, Canada
Filed June 9, 1975, Ser. No. 585,123
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 VV



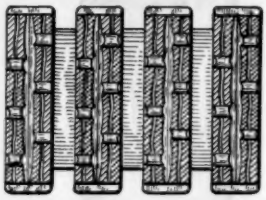
243,112
PLANT CONTAINER
Ronald John Gross, 10 Surrey Road, Mount Waverley, Victoria, Australia
Filed Nov. 11, 1974, Ser. No. 522,917
The portion of the term of this patent subsequent to Feb. 1, 1991, has been disclaimed.
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—152



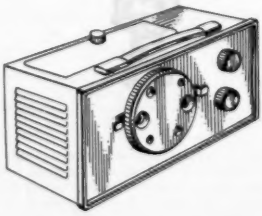
243,113
HYDROPONIC PLANTER
Michael J. Hirsch, Wayne, Pa., assignor to Hydroplanters, Inc., Wayne, Pa.
Filed Aug. 29, 1975, Ser. No. 609,011
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—156



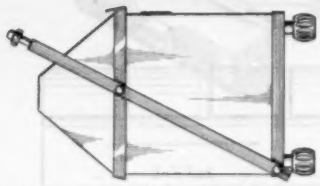
243,114
EXPANSIBLE LINK CHAIN FOR A BRACELET OR SIMILAR ARTICLE
Murray L. Cowan, Norwood, Mass., assignor to Textron Inc.
Filed Sept. 24, 1975, Ser. No. 616,316
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—23



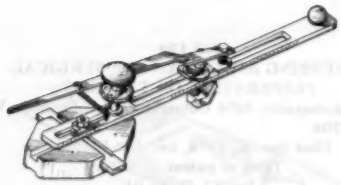
243,115
FIBER OPTIC LIGHT SOURCE
John S. Ziegler, Riverside; Donald J. Mosior, Mundelein, and Ronald L. Carroll, Evanston, all of Ill., assignor to American Hospital Supply Corporation, Evanston, Ill.
Filed Sept. 19, 1975, Ser. No. 614,964
Term of patent 14 years
Int. Cl. D26—*99*; D24—*02*
U.S. Cl. D48—20 E



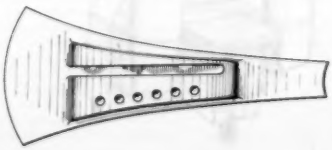
243,116
HOUSING FOR HORS D'OEUVRES OVEN
John M. Werling, 209 E. 36th St., Apt. No. 3, Kansas City, Mo. 64111
Filed Feb. 24, 1975, Ser. No. 552,442
Term of patent 14 years
Int. Cl. D7—*04*; D15—*08*
U.S. Cl. D15—104



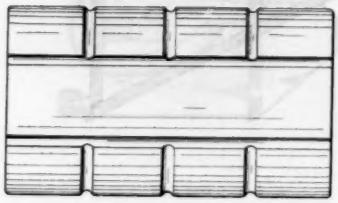
243,117
DEVICE FOR CUTTING PICTURE FRAME MAT BOARDS
Eugene T. Green, Maitland, Fla., assignor to Gene Green Associates, Inc., Maitland, Fla.
Filed May 30, 1975, Ser. No. 582,073
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—127



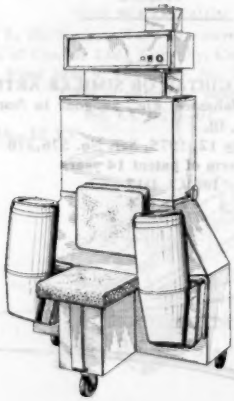
243,118
BRIDGE FOR GUITAR OR SIMILAR ARTICLE
Michael Kasha, Tallahassee, Fla., assignor to Norlin Music, Inc., Lincolnwood, Ill.
Filed May 12, 1975, Ser. No. 576,270
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D56—1 A



243,119
SOAP BAR
Bernard A. Mitchell, 1000 N. Lake Shore Drive, Chicago, Ill. 60611
Filed Aug. 20, 1975, Ser. No. 606,018
Term of patent 14 years
Int. Cl. D28—*02*
U.S. Cl. D73—1 A



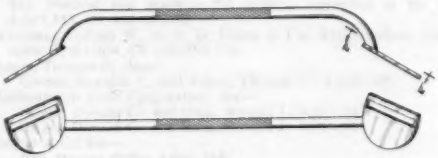
243,120
SCRUBBING APPARATUS FOR SURGICAL PREPARATION OR THE LIKE
Susumu Takabayashi, 9076 Columbine Ave., Fountain Valley, Calif. 92708
Filed Nov. 6, 1974, Ser. No. 521,467
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D83—1 F



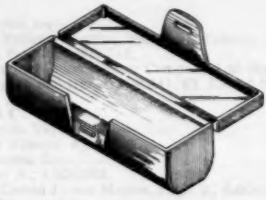
243,121
MEDICAL SOLUTION BAG
Philip G. Ralston, Jr., Buffalo Grove; Joe A. Miller, Lake Zurich, and Frank Cammarata, III, Wheeling, all of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.
Filed Mar. 17, 1975, Ser. No. 558,981
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D83—1 U

243,122
MEDICINAL APPLICATOR OR THE LIKE
Barry H. Dash, Englewood Cliffs, N.J., assignor to American Home Products Corporation (Del.), New York, N.Y.
Division of Ser. No. 468,050, May 8, 1974. This application Sept. 22, 1975, Ser. No. 615,322
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—12 A

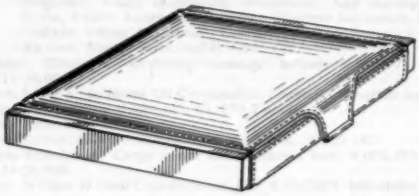
243,123
TIBIAL TEMPLATE FOR KNEE JOINT RECONSTRUCTION
George Shen; Stanley Patterson, and Carl E. Ellis, all of Warsaw, Ind., assignors to Zimmer, U.S.A. Inc.
Filed Dec. 15, 1975, Ser. No. 640,812
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—12 R

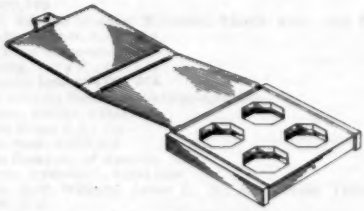


243,124
COMBINED LIPSTICK HOLDER AND MIRROR
William Horowitz, 243-20 72nd Ave., Douglaston, N.Y. 11363
Filed June 11, 1975, Ser. No. 585,982
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D86—10 G



243,125
DISPLAY CASE FOR OCTAGONAL COINS
Edmund Schnitzer, 5661 Edgemore, Cote St. Luc, Montreal, Quebec, Canada
Filed Mar. 7, 1975, Ser. No. 556,274
Term of patent 3½ years
Int. Cl. D3—*02*
U.S. Cl. D87—3 B





LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 18TH DAY OF JANUARY, 1977

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. H. Robins Company, Incorporated: *See—*
Lybrand, Robert Archie; and Bell, Louis Gary, 4,003,999.
Lybrand, Robert Archie; and Bell, Louis Gary, 4,004,002.

A. I. C. Photo, Inc.: *See—*
Masuoka, Seiichi, 4,003,637.

A. J. Shirk Roofing Company, Inc.: *See—*
Morris, Paul L., 4,003,553.

A. Johnson & Co. Inc.: *See—*
Cascone, Paul J., 4,003,715.

A and M Whitemetal Casting, Inc.: *See—*
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A. Monforts: *See—*
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AB Bofors: *See—*
Bjorn, Lars-Erik; and Olsson, Mats Jurgen Martin, 4,003,137.

Abbe, Jerome T. L.: *See—*
Kenigsberg, Irwin J.; Girvan, William A.; and Abbe, Jerome T. L., 4,003,534.

Abercrombie, William Floyd, Jr.: *See—*
Kunkle, Albert C.; and Abercrombie, William Floyd, Jr., 4,003,819.

Abrams, Eugene, to Solar Dynamics Corporation. Device for converting sunlight into electricity. 4,003,756, Cl. 136-89.0PC.

ABU Aktiebolag: *See—*
Moosberg, Borje Sigurd, 4,003,270.

ACCC, Inc.: *See—*
Aldridge, George E., 4,003,503.

ACF Industries, Incorporated: *See—*
Campbell, George C.; Hammonds, James C.; and Rollins, Dallas W., 4,003,319.

Acheson Industries, Inc.: *See—*
Cooper, Arthur William; and Rupp, Thomas Edmund, 4,003,867.

Acuff, Jerry Doyal. Vehicle sun blindness eliminator. 4,003,597, Cl. 296-97.00C.

Adair, Lyles C.: *See—*
Cook, Rufus L.; and Adair, Lyles C., 4,004,266.

Adams, David. Automatic lighted level and angle finder. 4,003,134, Cl. 33-348.000.

Adams, Don L., Sr.; and Johnson, Raymond G., Jr., to United Technologies Corporation. Heading hold logic. 4,003,532, Cl. 244-17.130.

Adams, Horst, to Panamera, A.G. Disc valve with improved seal ring. 4,003,394, Cl. 137-15.000.

Adams Rite Products, Inc.: *See—*
Geer, Larry A.; and Sheffer, Ralph L., 4,003,614.

Addmaster Corporation: *See—*
Busch, Richard E., 4,003,267.

Addressograph Multigraph Corporation: *See—*
Schulze, John Jacob, 4,003,527.

Adebahr, Klaus; and Gomann, Jurgen, to Hauni-Werke Korber & Co., KG. Method and machine for making cigarettes or the like. 4,003,385, Cl. 131-84.00B.

Adelstein, Gilbert W., to G. D. Searle & Co. Anti-diarrheal oxadiazoles. 4,003,904, Cl. 260-293.540.

Aders, Thomas D.: *See—*
Owens, Douglas F.; and Aders, Thomas D., 4,003,320.

Aeronutronic Ford Corporation: *See—*
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Kruse, Frederick V.; and Behrends, Deane O., 4,003,519.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
Sibi, Monique; and Demarly, Yves, 4,003,156.

Agency of Industrial Science & Technology: *See—*
Komiya, Yoshio; Suzuki, Eiichi; and Tarui, Yasuo, 4,003,632.

AGFA-Gevaert, A.G.: *See—*
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AGFA-GEVAERT N.V.: *See—*
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Agulnek, Harry: *See—*
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Aidlin, Joseph W.: *See—*
Kessler, Saul, 4,004,064.

Aishima, Itsuho; Sakurai, Hisaya; Takashi, Yukichi; Morita, Hideo; Ikegami, Tadashi; and Sato, Toshio, to Asahi Kasei Kogyo Kabushiki Kaisha. Process for the polymerization of ethylene. 4,004,071, Cl. 526-116.000.

Akashi, Goro; Fujiyama, Masaaki; and Kasuga, Akira, to Fuji Photo Film Co., Ltd. Process for production of motion picture film with sound track containing p-toluenesulfonic acid and glacial acetic acid. 4,003,743, Cl. 96-4.000.

Akimoto, Hidetoshi: *See—*
Hishinuma, Yukio; Akimoto, Hidetoshi; Tamura, Zensuke; and Nakajima, Fumito, 4,003,711.

Akiyama, Susumu, to Nippon Electric Company, Ltd. Hybrid feedback amplifier of a push-pull type. 4,004,241, Cl. 330-15.000.

A.B. Dick/Scott: *See—*
Gross, Frank C., 4,003,648.

Aktiebolaget Motala Verkstad: *See—*
Hedin, Borje Vilhelm, 4,003,687.

Akzona Incorporated: *See—*
Strade, Henry A., 4,004,005.
Yachabach, Gerald J.; and Mellon, Regis B., 4,004,106.

Alberto Culver Company: *See—*
Schmitt, William H., 4,004,036.

Albright, James A., to Michigan Chemical Corporation. N-substituted tetrahalophthalimides as flame retardants. 4,003,862, Cl. 260-2.5AJ.

Aldridge, George E., to ACCC, Inc. Dispensing device for highly viscous liquids supported in inclined position. 4,003,503, Cl. 222-173.000.

Alexandrov, Vyacheslav Sergeevich: *See—*
Guschin, Alexandr Evgenievich; Khokhryakov, Alexandr Andreevich; Pechko, Evgeny Yakovlevich; Obraztsov, Konstantin Ivanovich; Konstantinov, Anatoly Vasilievich; and Alexandrov, Vyacheslav Sergeevich, 4,003,105.

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Tishkov, Anatoly Yakovlevich; Fedorov, Sergei Alexandrovich; Freidin, Anatoly Markovich; Latyshev, Mikhail Zakharovich; Grigoriev, Vitaly Markovich; Menshikov, Jury Alexeevich; Bovin, Andrei Andreevich; Kreimer, Vladimir Isaakovich; Chekushkin, Viktor Ananievich; Lumpov, Vladimir Petrovich; and Alexeev, Dmitry Semenovich, 4,003,831.

Alfano, Elinor S. Revolving message holder. 4,003,471, Cl. 211-56.000.

Allen, Linus S., to Mobil Oil Corporation. Logging subsurface formations for porosity. 4,004,147, Cl. 250-264.000.

Allen, Robert K.: *See—*
Morrison, Howard J.; and Allen, Robert K., 4,003,142.

Allen, Rudolph A. Cargo vessel low resistance bow. 4,003,325, Cl. 114-56.000.

Allen, William H.; and Capano, Dom, to F & B/CECO Industries, Inc. Shutter-opening presetting mechanism for motion picture copying apparatus. 4,003,652, Cl. 355-71.000.

Allied Chemical Corporation: *See—*
Hoffman, Robert Joel; Bean, Samuel Louis; Seeling, Philip; and Swaine, James William, Jr., 4,003,985.
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Allmanna Svenska Elektriska Aktiebolaget: *See—*
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DeArdo, Anthony J., 4,004,066.
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Amano Corporation: *See—*
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Amaya, Yuji, to Fujitsu Ten Ltd. Radio receiver tuning control system. 4,004,232, Cl. 325-421.000.

American Air Filter Company, Inc.: *See—*
O'Dell, Leonard J., 4,003,727.

American Chain & Cable Company, Inc.: *See—*
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American Cyanamid Company: *See—*
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Cross, Barrington, 4,003,732.
Ebel, Robert Henry; and Lento, Louis Leonard, Jr., 4,003,851.
Savides, Christos; and Cannelongo, Joseph Frederick, 4,003,861.
Suen, Tzeng Jiueq; and Begala, Arthur James, Jr., 4,003,842.

American Flange & Manufacturing Co., Inc.: *See—*
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American Home Products Corporation: *See—*
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Winkley, Michael W.; and Wendt, Gerhard R., 4,003,888.

American Hospital Supply Corporation: *See—*
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AMP Incorporated: *See—*
Reynolds, Charles Edward, 4,003,623.

Amsler, Joachim, to Sprecher & Schuh AG. Arcing electrode, more particularly for vacuum switches. 4,004,117, Cl. 200-144.00B.

Amsler, Kurt: *See—*
Audykowski, Thaddeus; and Amsler, Kurt, 4,004,054.

Amstar Corporation: *See—*
Rizzuto, Anthony Benny; Skole, Richard David; Newman, Henry Harry; Hogu, Jacqueline Noailles-Benito; and Toscano, Vincent Anthony, 4,003,791.

Anaconda Company, The: *See—*
Payne, Thomas F.; and Sauer, Philip D., 4,003,724.

Andersen, Stephen Verner; and Swick, Edwin Grant, to Illinois Tool Works Inc. Apparatus for making a multifinger contact. 4,003,235, Cl. 72-326.000.

Anderson, John S.; and Anderson, Virginia B. Scheduling board. 4,003,150, Cl. 40-64.00R.

Anderson, Lowell R.: *See—*
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Anderson, Paul L., to Sandoz, Inc. Antihypertensive aryl pyrazolo[4,3-c]pyridazinones. 4,004,009, Cl. 424-250.000.

Anderson, Ronald L.; Castellani, Eugene E.; McCaffrey, Patrick M.; and Romankiw, Lubomyr T., to International Business Machines Corporation. Method for treating magnetic alloy to increase the magnetic permeability. 4,003,768, Cl. 148-108.000.

Anderson, Virginia B.: *See—*
Anderson, John S.; and Anderson, Virginia B., 4,003,150.

Andersson, Allan. Combination tool. 4,003,418, Cl. 145-50.00C.

Andrews, Donald Richard; and Leclere, Ralph Joseph, to International Business Machines Corporation. Last copy detection. 4,003,569, Cl. 271-259.000.

Andrews, Joseph J.: *See—*
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Anheuser-Busch, Incorporated: *See—*
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Robinson, Stephen Perrin; Evans, David Charles; and Hewitt, Martin, 4,004,276.

Antos, George J., to UOP Inc. Hydrocarbon conversion with an acidic multimetallic catalytic composite. 4,003,826, Cl. 208-139.000.

Antos, George J., to UOP Inc. Dehydrocyclization with an acidic multimetallic catalytic composite. 4,003,957, Cl. 260-673.500.

Aquafilter Corporation: *See—*
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Arai, Hiroshi; and Taniguchi, Koichi, to Nippondenso Co., Ltd.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Brake lining wear warning system. 4,004,269, Cl. 340-52.00A.

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Archibald, William E., to Cosden Technology, Inc. Ethylene-propylene copolymer emulsions. 4,003,869, Cl. 260-29.6XA.

Arendsen, Hans: *See—*
Cherubim, Martin; Wilms, Elmar; and Arendsen, Hans, 4,003,853.

Arens, Walter; and Noack, Wolfgang, to Siemens Aktiengesellschaft. Method for fade correction of communication transmission over directional radio paths. 4,004,224, Cl. 325-2.000.

Ariyasu, Kenji: *See—*
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Arndt, Richard Louis; and Teal, Thomas Richard, to International Business Machines Corporation. Self-clocking data entry unit system. 4,004,275, Cl. 340-168.00S.

Arnold, Kurt, to Valcor Engineering Corporation. Position indicating pulse latching solenoid. 4,004,258, Cl. 335-17.000.

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Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
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Bachmann, Kurt; and de Lamotte, Emanuel, to BBC Brown Boveri & Company Limited. Procedure for the production of permanent magnetic sinter bodies using a ternary cobalt-lanthanoid compound. 4,003,767, Cl. 148-105.000.

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Baird, William C., Jr.; and Bearden, Roby, Jr., to Exxon Research and Engineering Company. Combined desulfurization and hydroconversion with alkali metal hydroxides. 4,003,823, Cl. 208-108.000.

Baird, William C., Jr.; and Beardon, Roby, Jr., to Exxon Research and Engineering Company. Desulfurization and hydroconversion of residua with sodium hydride and hydrogen. 4,003,824, Cl. 208-108.000.

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Bald, Hubert; and Demny, Helmut, to Maschinenfabrik Alfred Schmermund. Device for securing tips to rod-shaped articles such as cigarettes. 4,003,386, Cl. 131-94.000.

Baldwin, George H. Device for displaying analog signals on a raster scanning display. 4,004,218, Cl. 324-57.0SS.

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Barcell, Ernest A., to Easy Engineering Corporation. Adjustable sweeping apparatus for feed grinders and the like. 4,003,502, Cl. 222-168.000.

Bardin, Karl D. Gravure printing method. 4,003,311, Cl. 101-426.000.

Barker, James N.; and Cartwright, Edward A., to Precision Thin Film Corporation. Safety system. 4,003,152, Cl. 42-70.00R.

Barlow, Jeremy Peter: *See—*
Holt, Barrie; and Barlow, Jeremy Peter, 4,003,463.

Barnabeo, Austin Emidio: *See—*
Creasy, Walter Stanley; and Barnabeo, Austin Emidio, 4,003,963.

Barnes, Lionel J.; Harwood, John H.; Harrison, David E. F.; and Doddema, Harmannus J., to Shell Oil Company. Nitrogen control in mixed culture production. 4,003,790, Cl. 195-28.00R.

Barnes, Richard D., to Conolon Corporation, The. Method of fabricating a demountable rod. 4,003,776, Cl. 156-242.000.

Baroni, Fausto: *See—*
Heim, Albert; and Baroni, Fausto, 4,003,784.

Barrett, Paul C.: *See—*
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Bartels-Keith, James R.; and Burgess, Mary T., to Polaroid Corporation. Meso-ionic se- and s-containing tetrazoles. 4,003,910, Cl. 260-308.00D.

Barth, C. Richard. Conveyor carriage and lading supporting rack. 4,003,315, Cl. 104-93.000.

BASF Aktiengesellschaft: *See—*
Koenig, Karl-Heinz; Kersten, Siegfried; and Reitel, Christian, 4,003,938.
Koester, Eberhard; Deigner, Paul; Falk, Roland; Uhl, Karl; and Schaefer, Dieter, 4,003,336.

Bassinger, Ross, to Reed Tool Company. Detachable drill bit for impact drilling. 4,003,442, Cl. 175-410.000.

Batt, Richard A.; and Green, Charles B., to International Paper Company. Method for making a garment. 4,003,775, Cl. 156-226.000.

Battain, Alfio: *See—*
Foglino, Giorgio; Battain, Alfio; and Cappucciati, Raffaello, 4,003,714.

Bauer, Everhard. Apparatus for distributing articles conveyed in a row among a plurality of paths of travel. 4,003,465, Cl. 198-442.000.

Bauer, William R.; and Blankinship, William A., to United States of America, Army. Process for extracting pitch information. 4,004,096, Cl. 179-1.0SC.

Baues, Peter; Mahlein, Hans; Winzer, Gerhard; and Reichelt, Achim, to Siemens Aktiengesellschaft. Coupling device for light waves. 4,003,629, Cl. 350-96.00C.

Baugh, Daniel W., Jr.: *See—*
Watt, George W.; and Baugh, Daniel W., Jr., 4,003,980.

Baumgartner Papiers S.A.: *See—*
Lebet, Jean-Pierre; and Ducommun, Joel Daniel, 4,003,774.

Bayder, George J., to Raymond Lee Organization, Inc., The, a part interest. Shoe shoelace accessory. 4,003,147, Cl. 36-136.000.

Bayer Aktiengesellschaft: *See—*
Auge, Wolfgang; Thiem, Karl-Werner; Neeff, Rutger; Losacker, Paul; and Braden, Rudolf, 4,003,924.
Botta, Artur, 4,003,907.
Gomm, Walter, 4,003,898.
Kempermann, Theo; and Marwede, Gunter, 4,003,843.
Kurtz, Peter, 4,003,944.
Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, 4,004,014.
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BBC Brown Boveri & Company Limited: *See—*
Bachmann, Kurt; and de Lamotte, Emanuel, 4,003,767.

Bean, Samuel Louis: *See—*
Hoffman, Robert Joel; Bean, Samuel Louis; Seeling, Philip; and Swaine, James William, Jr., 4,003,985.

Beard, Kenneth Drew: *See—*
Pearce, Godfrey Roy; Beard, Kenneth Drew; and Shively, Donald Lloyd, 4,004,199.

Bearden, Roby, Jr.: *See—*
Baird, William C., Jr.; and Bearden, Roby, Jr., 4,003,823.

Beardon, Roby, Jr.: *See—*
Baird, William C., Jr.; and Beardon, Roby, Jr., 4,003,824.

Beck, Joseph F. Devices and methods for taking dental impressions. 4,003,132, Cl. 32-17.000.

Becker, Lanson, to General Signal Corporation. Variable feedback steering system. 4,003,202, Cl. 60-385.000.

Beckman Instruments, Inc.: *See—*
Buzza, Edmund E.; and Sternberg, James C., 4,003,705.

Becton, Dickinson and Company: *See—*
Gerarde, Horace W., deceased; and Midlantic National Bank Citizens, executor, The, 4,003,262.

Beer, Issie M.; and Zelinski, Zenon A. Form pans for constructing ribbed slab structures. 4,003,542, Cl. 249-31.000.

Begala, Arthur James, Jr.: *See—*
Suen, Tzeng Jiueq; and Begala, Arthur James, Jr., 4,003,842.

Behrends, Deane O.: *See—*
Kruse, Frederick V.; and Behrends, Deane O., 4,003,519.

Beigler, Myron A.; Benken, William B.; and Nassar, Jorge J., to Syntex (U.S.A.) Inc. Hydrolytic process for the preparation of amino acids. 4,003,992, Cl. 424-101.000.

Beilfuss, Wolfgang: *See—*
Eggensperger, Heinz; Beilfuss, Wolfgang; and Ehlers, Helmut Hermann, 4,004,024.

Bell, Albert H., III; and Egli, Hans, to General Motors Corporation. Turbine engine with air brake. 4,003,199, Cl. 60-39.16R.

Bell, Louis Gary: *See—*
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Lybrand, Robert Archie; and Bell, Louis Gary, 4,004,002.

Bell Telephone Laboratories, Incorporated: *See—*
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Klingenberg, Alfred Simeon, 4,004,261.
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Belleau, Bernard: *See—*
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Bendix Corporation, The: *See—*
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Benken, William B.: *See—*
Beigler, Myron A.; Benken, William B.; and Nassar, Jorge J., 4,003,992.

Bennett, Robert A., to Bennett, Robert A.; and Mattern, Ware, Davis and Stoltz, part interest to each. Method of manufacturing the hook portions of a statistical hook and loop area fastener. 4,003,110, Cl. 28-72.00P.

Bennett, Thomas H.; Kouvoussis, Anthony E.; and Wiles, Michael F., to Motorola, Inc. Microprocessor chip register bus structure. 4,004,281, Cl. 340-172.500.

Bennett, Thomas H.; Carlow, Earl F.; Peddle, Charles; and Wiles, Michael F., to Motorola, Inc. Multiple interrupt microprocessor system. 4,004,283, Cl. 340-172.500.

Benruth Engineering & Manufacturing Company, Inc.: *See—*
Laskey, Ben G., 4,003,476.

Berge, Arthur. Information display device. 4,003,332, Cl. 116-131.000.

Berger, Emil J., Jr.; and Mitchard, John M., to Union Camp Corporation. Sheet pick-up and feeder. 4,003,567, Cl. 271-12.000.

Berkman, Joseph L. Case and insert for differently sized magnetic tape enclosures. 4,003,468, Cl. 206-387.000.

Bernhardt, Gunther; Trautvetter, Werner; and Minke, Rudeger, to Dynamit Nobel Aktiengesellschaft. Unsaturated ethylene-vinyl acetate copolymers and unsaturated polyethylenes and methods of preparing same by partial or exhaustive deacetylation of ethylene-vinyl acetate copolymers. 4,004,069, Cl. 526-48.000.

Bernheim, Willy: *See—*
Deiner, Hans; Sandner, Bernhard; and Bernheim, Willy, 4,004,059.

Bertagni, Jose Juan. Planar diaphragm. 4,003,449, Cl. 181-173.000.

Bertazzoni, Guido: *See—*
Biglione, Gianfranco; Alvares, Antonio; and Bertazzoni, Guido, 4,003,858.

Best, John S.; and McMillan, William J., to Dow Chemical Company, The. Heat or thermal energy storage structure. 4,003,426, Cl. 165-53.000.

Bethlehem Steel Corporation: *See—*
Kreiger, John W.; and Jablonski, Charles E., 4,003,736.

Beveridge, John; Davies, Thomas Roderick Harries; Fidler, Fred; and Ring, Maurice Frank, to Metal Box Limited. Container body side seam construction. 4,003,492, Cl. 220-62.000.

Bevilacqua, Frank, to Combustion Engineering, Inc. Fissionable mass storage device. 4,004,154, Cl. 250-518.000.

BHS-Bayerische Berg Hutten-und Salzwerke Aktiengesellschaft: *See—*
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Bianchi, Gaudenzio: *See—*
Radici, Pierino; Bianchi, Gaudenzio; Colombo, Daniele; and Colombo, Paolo, 4,003,960.

Bianchi, Giuseppe; de Nora, Vittorio; Gallone, Patrizio; and Nidola, Antonio, to Diamond Shamrock Technologies, S.A. Valve metal electrode with valve metal oxide semi-conductive coating having a chlorine discharge in said coating. 4,003,817, Cl. 204-290.00F.

Biet, Jean-Pierre; and Duchet, Michel, to Compagnie Generale d'Electricite. Device for blocking a laser beam. 4,003,631, Cl. 350-160.00R.

Bigelow, John Howard, to Du Pont de Nemours, E. I., and Company. Organic heterocyclic and thioaryl phosphines in silver halide emulsions and developers therefor. 4,003,746, Cl. 96-66.300.

Biglione, Gianfranco; Alvares, Antonio; and Bertazzoni, Guido, to Montedison Fibre S.p.A. Process for producing expandible styrene polymers useful in the manufacture of shaped cellular articles. 4,003,858, Cl. 260-2.5HB.

Biland, Hans Rudolf: *See—*
Luthi, Christian; Dunnenberger, Max; and Biland, Hans Rudolf, 4,003,875.

Bilotta, Vincent Francis: *See—*
Graser, Michael, Jr.; and Bilotta, Vincent Francis, 4,003,634.

Bingaman, Harold J. Valved canning lid. 4,003,489, Cl. 215-260.000.

Bio-Dynamics, Inc.: *See—*
McKay, Douglas William; Bolinger, Teddy L.; and Emerick, Norman L., 4,003,376.

Bio-Systems Research Inc.: *See—*
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Biofac A/S: *See—*
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BioMagnetics International, Inc.: *See—*
Davis, Albert Roy, 4,003,769.

Bird Machine Company, Inc.: *See—*
Fisher, William F., 4,003,115.

Birum, Gail H., to Monsanto Company. Phosphorus compounds. 4,003,965, Cl. 260-932.000.

Bjorn, Lars-Erik; and Olsson, Mats Jurgen Martin, to AB Bofors. Method of drying wet powder. 4,003,137, Cl. 34-25.000.

Black and Decker Manufacturing Company, The: *See—*
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Black Products Company: *See—*
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Blackwood, Robert S., to Fluoroware Systems Corporation. Hot plates. 4,004,130, Cl. 219-459.000.

Blanchet, James P.: *See—*
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Blankinship, William A.: *See—*
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Blanks Engraving Company: *See—*
Blanks, William L., 4,003,745.

Blanks, William L., to Blanks Engraving Company. Method for identifying color separation film. 4,003,745, Cl. 96-41.000.

Bliven, Thomas G.; and Hugill, John R., to Motorola, Inc. Gateless injection mold for encapsulating semiconductor devices. 4,003,544, Cl. 249-95.000.

Blu, Gilbert; and Lazarre, Flavien, to Societe Nationale des Petroles d'Aquitaine. Method of analysis by liquid-phase chromatography. 4,003,243, Cl. 73-61.10C.

Blunck, Otto, to H. Maihak A.G. Infrared gas analyzing photometer with chopper designed to avoid radiation waste. 4,004,146, Cl. 250-345.000.

Boaz, Premakaran T., to Ford Motor Company. Windshield heating device. 4,004,126, Cl. 219-203.000.

Boehringer Ingelheim GmbH: *See—*
Langbein, Adolf; Merz, Herbert; Walther, Gerhard; and Stockhaus, Klaus, 4,004,010.
Losel, Walter; Merz, Herbert; Hoefke, Wolfgang; and Traunecker, Werner, 4,003,998.
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Boeing Company, The: *See—*
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Boersma, Rintje; and Irik, Gijsbert Waldemar, to COQ B.V. Metal clad monophase switchgear panels for high voltages and polyphase switching plants consisting of such switchgear panels. 4,004,118, Cl. 200-148.00B.

Bolach, Joseph P. Game apparatus. 4,003,577, Cl. 273-134.00C.

Bolinger, Teddy L.: *See—*
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Bolton, Ivan Joseph; Mercer, Alec Victor; and Fleck, Fritz, to Sandoz Ltd. 1,3-Diaryl-2-pyrazoline derivatives. 4,003,889, Cl. 260-239.900.

Bondarenko, Stanislav Vasilievich: *See—*
Volkov, Dmitry Pavlovich; Krainev, Alexandr Filippovich; Stupakov, Alexandr Alexeevich; and Bondarenko, Stanislav Vasilievich, 4,003,272.

Bonelle, Roger George: *See—*
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Book, Harold M. Two level flush tank valve mechanism. 4,003,097, Cl. 4-67.00A.

Booty, Donald J. Multiple socket strip. 4,003,618, Cl. 339-22.00R.

Booze, Joe L. Mounting and braking apparatus for coiled welding wire. 4,003,528, Cl. 242-106.000.

Borg-Warner Corporation: *See—*
Rickert, Paul E., 4,003,968.
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Bormann, Alan Richard; and Yu, Robert Tapei, to Motorola, Inc. Read-write circuitry for one transistor per bit random access memory. 4,004,285, Cl. 340-173.0CA.

Bossert, Friedrich: *See—*
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Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, 4,004,015.

Boston, William Thomas, to Optronics International, Inc. Method and apparatus for dual resolution photographic reproduction of line and continuous tone graphic materials. 4,004,079, Cl. 358-256.000.

Bostroem, Theodore. Pipeline of assembled field units of pipe elements and method of installing same. 4,003,210, Cl. 61-105.000.

Botta, Artur, to Bayer Aktiengesellschaft. Δ^1-1-Azacycloalkene-2-carboxylic acids and their production. 4,003,907, Cl. 260-295.00R.

Boughers, Gordon Neal. Multiple wheel motorcycle suspension and drive system. 4,003,443, Cl. 180-27.000.

Boullier, Francois: *See—*
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Bovin, Andrei Andreevich: *See—*
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Bowler, Jean; Brown, Edward Douglas; Marsham, Peter Robert; and Walker, Edward Raymond Halstead, to Imperial Chemical Industries Limited. Cyclopentane derivatives. 4,004,021, Cl. 424-278.000.

Bowser, Everett N. Multiple test tube evaporator. 4,003,713, Cl. 23-292.000.

Boxall, Frank S. Hybrid circuit. 4,004,109, Cl. 179-170.0NC.

Boyko, Eugene S.; Campbell, Joseph; and Wiggins, Roger J., to Westinghouse Electric Corporation. Nuclear fuel elements sealed by electric welding. 4,003,788, Cl. 176-79.000.

Braden, Rudolf: *See—*
Auge, Wolfgang; Thiem, Karl-Werner; Neeff, Rutger; Losacker, Paul; and Braden, Rudolf, 4,003,924.

Bradley, Charles H.: *See—*
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Bradley, Curtis E. Fuel regenerated non-polluting internal combustion engine. 4,003,204, Cl. 60-618.000.

Bradley, Curtis E. Fuel regenerated non-polluting internal combustion engine. 4,003,344, Cl. 123-3.000.

Bradley, Curtis E. Fuel regenerated non-polluting internal combustion engine. 4,003,345, Cl. 123-3.000.

Brady, Rupert J., to Walter Kidde & Company, Inc. Crane boom of trapezoidal boom sections having reinforcing rings. 4,003,168, Cl. 52-118.000.

Brady, William C.; Warner, Arthur S.; and Hankinson, Harold D., to Owens-Corning Fiberglas Corporation. Apparatus for making glass fibers. 4,003,730, Cl. 65-1.000.

Brand, William Wayne; and Lovell, James Byron, to American Cyanamid Company. Insect control compounds. 4,004,019, Cl. 424-277.000.

Branson, Charles D., to Robertshaw Controls Company. Electric ignition system. 4,003,360, Cl. 126-39.00E.

Braun, Daniel E.; and Harkness, Joseph R., to Briggs & Stratton Corporation. Safety device for walk-behind rotary mowers. 4,003,190, Cl. 56-10.500.

Brecher, Charles: *See—*
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Bredael, Ivo Leo; and Laghi, Fulvio, to European Atomic Energy Community (Euratom). Ultrasonic signal generators. 4,004,165, Cl. 310-8.100.

Breuer, Hermann; and Treuner, Uwe D., to E. R. Squibb & Sons, Inc. 3-Heterothio[(thioalkyl)thioacetyl]cephalosporanic derivatives. 4,003,893, Cl. 260-243.00C.

Brewer, Arthur D.; and Davis, Robert A., to Uniroyal Inc.; and Uniroyal, Ltd. 2,3-Dihydro-1,4-dithiin 1,1,4,4-tetroxide antimicrobials. 4,004,018, Cl. 424-277.000.

Brewin, Thomas A.: *See—*
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Brickman, W. James, to Scott Paper Company. Graft copolymerization processes. 4,003,701, Cl. 8-115.600.

Briggs, Donald C.; and Haas, Ronald J., to Aeronutronic Ford Corporation. Rechargeable electrochemical cell. 4,004,067, Cl. 429-57.000.

Briggs, Donald C.; and Haas, Ronald J., to Aeronutronic Ford Corporation. Electrochemical cell of a rechargeable nature. 4,004,068, Cl. 429-57.000.

Briggs & Stratton Corporation: *See—*
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Brinton, Michael Brian Jervis, to R. N. L. I. (Trading) Limited. Exhaust valve assembly for preventing ingress of water to an outboard marine engine. 4,003,331, Cl. 115-17.000.

Bristol, James A.: *See—*
Yale, Harry L.; and Bristol, James A., 4,003,905.
Yale, Harry L.; and Bristol, James A., 4,004,016.

Bristol-Myers Company: *See—*
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British Cast Iron Research Assoc., The: *See—*
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Britt, Robert E. Discovery in adjustable thresholds and methods of making and using the same. 4,003,162, Cl. 49-468.000.

Brodin, Eric. Device in rope hoists for limiting speed when lowering a load. 4,003,550, Cl. 254-151.000.

Brody, Philip S., to United States of America, Army. High voltage particle accelerator utilizing polycrystalline ferroelectric ceramic material. 4,004,175, Cl. 313-360.000.

Broeckl, Heinz; Forch, Friedrich; Freudenschuss, Otto; Keznickl, Eduard; Patels, Gottfried; and Rollenitz, Leopold, to Vockenhuber,

Karl; and Hauser, Raimund. Film-handling apparatus. 4,003,645, Cl. 352-109.000.
Brolin, Charles A., to FMC Corporation. Crane boom lattice and hoist line protection assembly. 4,003,475, Cl. 212-144.000.
Brooks, J. Clayton: *See—*
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Brown Boveri-Sulzer Turbomachinery, Ltd.: *See—*
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Brown, Earl Franklin; Limb, John Ormond; and Prasada, Birendra, to Bell Telephone Laboratories, Incorporated. Video conferencing system using spatial reduction and temporal resolution. 4,004,084, Cl. 358-133.000.
Brown, Edward Douglas: *See—*
Bowler, Jean; Brown, Edward Douglas; Marsham, Peter Robert; and Walker, Edward Raymond Halstead, 4,004,021.
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Bruck, Gernot Klaus. Apparatus for locally irradiating a part of a living body. 4,003,383, Cl. 128-404.000.
Bruso, Galen: *See—*
Kelly, J. Joseph, III; and Bruso, Galen, 4,003,668.
Buck, Carl J., to Johnson & Johnson. Blocked bis 2-cyanoacrylate monomers. 4,003,942, Cl. 260-464.000.
Buckley, Betty J. Colander system for bakery products use. 4,003,522, Cl. 241-95.000.
Buckley, Charles Omar: *See—*
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Bulloch, Carl Gordon, Jr. Method of forming a spring cushion construction. 4,003,113, Cl. 29-91.100.
Bullock, Robert L.; and Geyer, Robert P., to Standard Car Truck Company. Reinforced bolster pocket wall. 4,003,318, Cl. 105-226.000.
Bundy Corporation: *See—*
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Bunker Ramo Corporation: *See—*
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Bunn, Julian Wilbur, Jr.; and Buckley, Charles Omar, to Trienco, Inc. Apparatus for purifying hydrogen gas. 4,003,725, Cl. 55-158.000.
Burckhardt, Manfred H., to Daimler-Benz Aktiengesellschaft. Servo steering system for vehicles, especially motor vehicles. 4,003,404, Cl. 137-627.500.
Burger, Edward D.; Curtin, Daniel J.; and Edison, Robert R., to Atlantic Richfield Company. Method of removing contaminant from a hydrocarbonaceous fluid. 4,003,829, Cl. 208-253.000.
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Busch, Richard E., to Addmaster Corporation. Cyclically operable drive transmission. 4,003,267, Cl. 74-84.00R.
Buss, Karl-Bernd, to GRUNDIG E.M.V. Elektro-Mechanische Versuchsanstalt Max Grundig. Apparatus for the television reconnoitering of terrain from the air. 4,004,086, Cl. 358-109.000.
Butka, Kemal. Mechanical pencil with lead feed responsive to writing pressure. 4,003,664, Cl. 401-67.000.
Buzza, Edmund E.; and Sternberg, James C., to Beckman Instruments, Inc. Analysis apparatus and method of measuring rate of change of electrolyte pH. 4,003,705, Cl. 23-230.00R.
Bylander, Ernest Gerald, to Texas Instruments Incorporated. Vacuum fluorescent display having a grid plate coplanar with the anode. 4,004,186, Cl. 315-167.000.
Byrd, Edward E. Cam loom apparatus and method. 4,003,406, Cl. 139-80.000.
Byron Jackson, Inc.: *See—*
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Bystrova, Vera Ivanovna; Kirillova, Galina Konstantinovna; and Mikhailova, Galina Atkhipovna. Process for producing non-porous coating for corundum substrates. 4,004,052, Cl. 427-374.00F.
C.A.V. Limited: *See—*
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C.G.R.-Mev.: *See—*
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C & K Components, Inc.: *See—*
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Cadorette, Raymond: *See—*
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Caffrey, James M., Jr.: *See—*
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Cahn, Robert P., to Exxon Research and Engineering Company. Thermal energy storage and utilization system. 4,003,786, Cl. 176-39.000.
Cain, Patrick J., to MTS Systems Corporation. Specimen crack stress intensity control loop for test device. 4,003,246, Cl. 73-90.000.
Cairo, Anthony C.; and Holkeboer, Ronald E., to Robertshaw Controls Company. Primary control system for furnaces and method of making the same. 4,004,198, Cl. 317-155.500.
Calderazzo, Fausto: *See—*
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Callighan, Robert H.; and Hawthorne, John O., to United States Steel Corporation. Novel iron oxide catalysts. 4,003,850, Cl. 252-455.00R.
Camarero, George L. Disposable bath towel and dispensing device. 4,003,509, Cl. 225-23.000.
Camp, Floyd E.; and Hirayama, Chikara, to Westinghouse Electric Corporation. Copper extraction by arc heater. 4,003,739, Cl. 75-72.000.
Campbell, Carl D.: *See—*
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Campbell, George C.; Hammonds, James C.; and Rollins, Dallas W., to ACF Industries, Incorporated. Tubular through sill railway hopper car. 4,003,319, Cl. 105-248.000.
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Babcock, John C.; and Campbell, J. Allan, 4,004,003.
Campbell, Joseph: *See—*
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Caswell, Bruce F.; and Puddington, I. E., 4,003,737.
Donelan, A. Mark; and White, Bryan F., 4,003,256.
Hayes, William F.; Tanney, John W.; and Tucker, Helen G., 4,003,405.
Holmes, Frank E.; and Salama, Clement A. T., 4,003,126.
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Cannelongo, Joseph Frederick: *See—*
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Canon Kabushiki Kaisha: *See—*
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Canup, Robert E., to Texaco Inc. Means and method for controlling the occurrence and the duration of time intervals during which sparks are provided in a multicylinder internal combustion engine. 4,003,354, Cl. 123-117.00R.
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Allen, William H.; and Capano, Dom, 4,003,652.
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Carbonnel, Henri, to Groupement pour les Activities Atomiques et Advancees "GAAA". Gas-treatment plant for molten metal. 4,003,560, Cl. 266-217.000.
Carborundum Company, The: *See—*
Carpenter, James H., Jr.; Bradley, Charles H.; and Ixer, Bernard W., 4,003,164.
Card & Co., Inc.: *See—*
Card, Roy T., 4,003,321.
Card, Roy T., to Card & Co., Inc. Cut pile apparatus for staggered needle tufting machine. 4,003,321, Cl. 112-79.00R.
Carder, Charles H., to Union Carbide Corporation. Coating and ink compositions. 4,003,751, Cl. 106-20.000.
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Smith, Oliver Wendell; Carder, Charles Hobert; and Trecker, David John, 4,003,868.
Cardon, Carlos D.; and Griffone, Lawrence P., to Sperry Rand Corporation. Programmable bandpass digital filter of analog signal. 4,004,236, Cl. 328-138.000.
Cardone, Vincent. System for time sharing an audio amplifier. 4,004,095, Cl. 179-1.0GQ.
Carella, Richard F. Arrow. 4,003,576, Cl. 273-106.50C.
Carlow, Earl F.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Peddle, Charles; and Wiles, Michael F., 4,004,283.
Carlson, David H. J.; and Urban, Peter, to Universal Oil Products Company. Mercaptan conversion process for a petroleum distillate charge stock. 4,003,827, Cl. 208-206.000.
Carlson, Ronald H.: *See—*
Manganaro, James L.; and Carlson, Ronald H., 4,003,899.
Carmichael, Richard Quentin; Bonelle, Roger George; and Hartley, John Edward, to T. I. (Group Services) Limited. Shearing tube stock. 4,003,279, Cl. 83-199.000.
Carnahan, David A. Apparatus for the replacement of seals in a well ram type blow out preventer. 4,003,430, Cl. 166-85.000.
Carney, William V. Protector module for telephone systems. 4,004,192, Cl. 317-16.000.
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Carrier Corporation: *See—*
Hogue, Ronald P.; Hill, Robert D., Jr.; and Gerwitz, Paul F., 4,004,264.
McGrath, William L., 4,003,729.
Carroll, Charles D., to General Motors Corporation. Porous laminated sheet. 4,004,056, Cl. 428-138.000.
Carter, Glenn T.; and Paniszczyn, Thomas F., to General Dynamics Corporation. Combination airbrake and pitch control device. 4,003,533, Cl. 244-42.00D.
Carter, Robert M., to FMC Corporation. Crawler drive system. 4,003,608, Cl. 305-57.000.
Cartwright, Edward A.: *See—*
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Carver, Robert G. Fishing lure. 4,003,154, Cl. 43-42.130.
Cascone, Paul J., to A. Johnson & Co. Inc. Copper-manganese-zinc brazing alloy. 4,003,715, Cl. 29-182.300.
Casey, Joseph Taggart. Portable and detachable double casement window opposing turn latch handles lock securing device. 4,003,227, Cl. 70-14.000.
Cass, Boyd E.; Coate, David W.; and Quigley, Joseph R., to Carad, Inc. Method and apparatus for recovering by-product silt fines from a slurry thereof. 4,003,717, Cl. 44-10.00R.
Cassano, James R.: *See—*
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Castellani, Eugene E.: *See—*
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Caswell, Bruce F.; and Puddington, I. E., to Canadian Patents and Development Limited. Method of agglomerating with additives in the bridging liquid. 4,003,737, Cl. 75-3.000.
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Kupfert, Bernard F.; and Augustine, Richard L., 4,003,452.
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Stevens, Wallace Gene; and Karstensen, Karl Wilfred, 4,003,675.
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Catoul, Philippe Felix: *See—*
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Cavender, James V., Jr., to Monsanto Company. Detoxification of aqueous waste streams containing cyanide. 4,003,833, Cl. 210-59.000.
Cecere, Anthony Robert; and McTighe, William. Earring structure. 4,003,216, Cl. 63-12.000.
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Celanese Corporation: *See—*
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Ceresara, Sergio; Sacerdoti, Giancarlo; and Sacchetti, Nicola. Process for the production of superconductor wires or cables of Nb_3Al and superconductor wires or cables obtained thereby. 4,003,762, Cl. 148-11.50R.
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Claxton, William Eugene; and Cernik, Bruce Milan, 4,004,272.
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Sovicka, Rostislav, 4,003,657.
Chako, Andre L., to A and M Whitemetal Casting, Inc. Fluorescent light unit. 4,004,144, Cl. 240-51.11R.
Chalmers, Brian John; and Gibson, John Phillip, to C.A.V. Limited. Drive systems using a. c. motors. 4,004,203, Cl. 318-171.000.
Champion International Corporation: *See—*
Cohn, Robert, 4,003,780.
Owens, Douglas F.; and Aders, Thomas D., 4,003,320.
Chantry, William Amdor; and Conrad, Roddy Merl, to Du Pont de Nemours, E. I., and Company. Continuous spin-drawing process for preparing polyethylene terephthalate yarns. 4,003,974, Cl. 264-210.00F.
Chapman, Derek D.: *See—*
Heseltine, Donald W.; Kurtz, Donald W.; Chapman, Derek D.; and Elwood, James K., 4,003,750.
Chapman, Orville L.: *See—*
Napier, Roger Paul; and Chapman, Orville L., 4,003,966.
Chapnikoff, Roland, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Microwave frequency phase modulator. 4,004,255, Cl. 333-31.00R.
Charlton, Thomas, to Westinghouse Electric Corporation. Holder for anchoring leads to dynamoelectric machines. 4,004,169, Cl. 310-71.000.
Chauffoureaux, Jean, to Solvay & Cie. Equipment for heating polar polymers to the temperature at which they become plastic. 4,003,554, Cl. 259-4.0AC.
Cheadle, George D.; and Dhondt, Roland O., to Union Oil Company of California. Superatmospheric pressure shale retorting process. 4,003,797, Cl. 201-28.000.
Chekushkin, Viktor Ananievich: *See—*
Tishkov, Anatoly Yakovlevich; Fedorov, Sergei Alexandrovich; Freidin, Anatoly Markovich; Latyshev, Mikhail Zakharovich; Grigoriev, Vitaly Markovich; Menshikov, Jury Alexeevich; Bovin, Andrei Andreevich; Kreimer, Vladimir Isaakovich; Chekushkin, Viktor Ananievich; Lumpov, Vladimir Petrovich; and Alexeev, Dmitry Semenovich, 4,003,831.
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Cherrington, Martin D., to Tidril Corporation. Apparatus and process for drilling underground arcuate paths utilizing directional drill and following liner. 4,003,440, Cl. 175-61.000.
Cherubim, Martin; Wilms, Elmar; and Arendsen, Hans, to Deutsche Texaco Aktiengesellschaft. Method of activating a supported olefin conversion catalyst. 4,003,853, Cl. 252-467.000.
Chevron Research Company: *See—*
Hutchison, Stanley O., 4,003,581.
Cheze, Bernard J., to Societe Anonyme dite: Potain Poclain Materiel. Safety device for a crane. 4,003,482, Cl. 212-39.000.
Chikaoka, Sadashi; Kawabe, Toyotaro; Miyakawa, Hisashi; and Seki, Naotoshi, to Mitsui Toatsu Chemicals, Incorporated. Treatment of water vapor generated in concentrating an aqueous urea solution. 4,003,801, Cl. 203-42.000.
Childs, William V.; and Ruehlen, Forrest N., to Phillips Petroleum Company. Electrochemical fluorination of ketones within the pores of an anode. 4,003,807, Cl. 204-59.00F.
Chin, John W. G.: *See—*
Shapiro, Justin Joel; Shapiro, Marion Henrietta; and Chin, John W. G., 4,003,499.
Chiodini, Fernando, to Fenco Corporation. Pneumatic cylinder for controlling electrical switch operation. 4,004,116, Cl. 200-82.00R.
Chobanov, Tsvetko: *See—*
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Christakos, Nicolaos C. Rifle. 4,003,292, Cl. 89-145.000.
Christie, John S., Jr.; Hunter, Richard S.; and Jenkins, S. Upton, to Hunter Associates Laboratory, Inc. Sensing head assembly for multicolor printing press on-line densitometer. 4,003,660, Cl. 356-178.000.
Chudnovsky, Vladimir Sergeevich: *See—*
Novikov, Sergei Sergeevich; Khmelnitsky, Lenor Ivanovich; Lebedev, Oleg Vasilievich; Epishina, Lia Vladimirovna; Suvorova, Ljudmila Ivanovna; Lapshina, Lidia Vasilievna; Krylov, Valery Dmitrievich; Zaikonnikova, Irina Vitalievna; Zimakova, Irina Evgenievna; Chudnovsky, Vladimir Sergeevich; Babichev, Viktor Andreevich; and Avdonina, Nina Alexandrovna, 4,004,013.
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Audykowski, Thaddeus; and Amsler, Kurt, 4,004,054.
Creighton, Gordon Robert; and Hayes, Barry James, 4,004,061.
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Drabek, Jozef, 4,004,031.
Haas, Georges; Jenny, Erwin F.; and Rossi, Alberto, 4,004,026.
Kuhn, Martin; and Harris, Melvin, 4,003,846.
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Cities Service Company: *See—*
Pelofsky, Arnold H.; and Greene, Marvin, 4,003,820.
Roth, Shirley H.; and Stoy, William S., 4,003,864.
Stoy, William S.; and Roth, Shirley H., 4,003,863.
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Clarke, E. Colin W.; Gilbert, Jeffrey F.; and Glew, David N., to Dow Chemical Company, The. Sulfurless electrolytic concentration of aqueous sulfuric acid solutions. 4,003,816, Cl. 204-237.000.
Clarke, Graham Morley, to Ferranti, Limited. Discrimination circuit for isolating disturbance signals which are superimposed on D.C. pedestals. 4,004,239, Cl. 329-109.000.
Claxton, William Eugene; Gardner, James Dennis; and Janssen, Marvin Lynn, to Firestone Tire & Rubber Company, The. Electronic tire pressure alarm circuitry. 4,004,270, Cl. 340-58.000.
Claxton, William Eugene; and Cernik, Bruce Milan, to Firestone Tire & Rubber Company, The. Optical pressure switch. 4,004,272, Cl. 340-58.000.
Cleveland, Joseph J.: *See—*
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Cluett, Peabody & Co., Inc.: *See—*
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Clupak, Inc.: *See—*
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Cobb, Delwin E.: *See—*
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Codex Corporation: *See—*
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Cohen, Noal; and Saucy, Gabriel, to Hoffmann-La Roche Inc. Steroid intermediates. 4,003,949, Cl. 260-590.00R.

Cohen, Samuel G. Audible resistance or voltage tester. 4,004,223, Cl. 324-62.000.

Cohn, Robert, to Champion International Corporation. Tape dispensing apparatus. 4,003,780, Cl. 156-519.000.

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Gray, Frederick William; and Jervert, Jon C., 4,003,700.
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Collins, Robert James; and Coverdale, Charles E., to Upjohn Company, The. Compositions and method for treating epilepsy and convulsions. 4,004,029, Cl. 424-325.000.

Collins, Wesley A. Mechanical barrier. 4,003,161, Cl. 49-35.000.

Colombo, Daniele: *See—*
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Colombo, Paolo: *See—*
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Combustion Unlimited Incorporated: *See—*
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Commerford, H. Fred; Dreshfield, Arthur C.; and Sellors, Thomas J., to Potlatch Corporation. Ice cream carton. 4,003,516, Cl. 229-51.05C.

Commissariat a l'Energie Atomique: *See—*
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Marmonier, Pierre; Mesnage, Bernard; Teulon, Jean; and Simonneau, Jean-Pierre, 4,003,787.

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Compagnie Generale d'Electricite: *See—*
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Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie: *See—*
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Compagnie Industrielle des Telecommunications Cit-Alcatel: *See—*
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Compton, Jack Bernard Spencer, to Silentbloc Limited. Marine engine mount. 4,003,330, Cl. 115-.50B.

Compur-Electronic Gesellschaft mit beschrankter Haftung: *See—*
Retzer, Erich; Holzinger, Otto; and Pross, Wilhelm, 4,003,662.

Conard, Robert G.; and Pell, Kynric M., to United States of America, Army. Single plane corner reflector guidance system. 4,003,659, Cl. 356-152.000.

Connell, James. Cover retention system. 4,003,604, Cl. 301-37.0CD.

Connick, Francis G., to Swift and Company Limited. Method of making canned food recyclable thermal simulator. 4,003,124, Cl. 29-460.000.

Connick, Francis G., to Swift and Company Limited. Peanut butter manufacture. 4,004,037, Cl. 426-324.000.

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Conrad, Roddy Merl: *See—*
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Consolidated Natural Gas Service Co., Inc.: *See—*
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Continental Group, Inc., The: *See—*
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Cook, John C., to Teledyne Industries, Inc. In-line stress/strain detector. 4,004,268, Cl. 340-17.00R.

Cook, Rufus L.; and Adair, Lyles C., to United States of America, Navy. Transducer array having low cross-coupling. 4,004,266, Cl. 340-9.000.

Coombs, David H., to United States of America, Health, Education and Welfare. Density gradient fractionation by piston displacement. 4,003,834, Cl. 210-83.000.

Cooper, Arthur William; and Rupp, Thomas Edmund, to Acheson Industries, Inc. Glass mold coating dispersion of aluminum phosphate and resinous agent, pigment, stabilizer and dispersing agents. 4,003,867, Cl. 260-17.500.

Cooper, Robert C., to General Electric Company. Starting circuit for inverter operated gaseous discharge lamps. 4,004,188, Cl. 315-261.000.

Cooper, Roydon B., to Pall Corporation. Dual coaxial bidirectional valves and filter assemblies and hydrostat systems containing the same. 4,003,397, Cl. 137-493.900.

COQ B.V.: *See—*
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Corbic nee Busnel, Bernadette, to Societe: Toscara Anstalt. Process and apparatus for the manufacture of white cheese or yoghurt. 4,003,490, Cl. 220-22.300.

Corliss, Robert F.; and Wilkinson, Frank, to Tyme Valve Corporation. Battery operated, fluid pressure responsive valve controller. 4,003,402, Cl. 137-624.180.

Cornwell, Leroy. Self locking and unlocking clamp for automatic fastener driving tools. 4,003,417, Cl. 144-32.00R.

Corson, Frederick P.: *See—*
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Cortese, Gaetano. Bag convertible into a portable seat. 4,003,455, Cl. 190-8.000.

Cosco, Robert J.; Pappas, John A.; and Brewin, Thomas A., to GTE Sylvania Incorporated. Three-electrode short duration flash tube. 4,004,189, Cl. 315-335.000.

Cosden Technology, Inc.: *See—*
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Costanza, John R.; and Faust, Ellsworth E., to Celanese Corporation. High solids styrene-butadiene emulsions. 4,003,871, Cl. 260-29.70R.

Cotter, Robert James; Keogh, Michael John; and Heitz, William Donald, to Union Carbide Corporation. Method for the adsorption of sulfur dioxide. 4,003,848, Cl. 252-427.000.

Council, Clifton Temple: *See—*
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Courtney, John E.; Urso, Charles J.; and Wilson, Charles D., to Xerox Corporation. Controller for reproduction apparatus. 4,003,650, Cl. 355-14.000.

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Cox, Robert Bruce. Triple-point heat pump. 4,003,213, Cl. 62-124.000.

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Craig, Edward A., Jr. Amusement ball for bouncing. 4,003,573, Cl. 273-58.00K.

Craig, Robert Jerzy G.; and Council, Clifton Temple, to Litton Systems, Inc. Mass balancing system for rotatable assemblies. 4,003,265, Cl. 74-5.00R.

Cramer-Halstrup & Schrunder: *See—*
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Cranford, Hayden Clavie, Jr.; and Hoffman, Charles Reeves, to International Business Machines Corporation. Compensating current source. 4,004,164, Cl. 307-297.000.

Crawford, Douglas J.; LeMere, Roger; and Hughes, Francis H., to Cluett, Peabody & Co., Inc. Apparatus for manufacturing and stacking hemmed fabric pieces. 4,003,323, Cl. 112-141.000.

Crawford, George H.; and Kowanko, Nicholas, to Minnesota Mining and Manufacturing Company. Process for producing polyhalocarbons oxides. 4,003,941, Cl. 260-463.000.

Creasy, Walter Stanley; and Barnabeo, Austin Emidio, to Union Carbide Corporation. Vinyl chloride polymer barrier packaging compositions. 4,003,963, Cl. 260-897.00C.

Creighton, Gordon Robert; and Hayes, Barry James, to Ciba-Geigy Corporation. Adhesives. 4,004,061, Cl. 428-349.000.

Cresswell, Michael Alan: *See—*
Mill, Patrick James; Cresswell, Michael Alan; and Feinberg, Joseph George, 4,003,792.

Creusot-Loire: *See—*
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Cross, Barrington, to American Cyanamid Company. Pyrazolinium compounds as herbicides. 4,003,732, Cl. 71-92.000.

Crossley Window Co., Inc.: *See—*
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Crowle, Brian, to RCA Corporation. Phase-splitter circuits. 4,004,240, Cl. 330-14.000.

Crown City Plating Company: *See—*
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CTEC Corporation: *See—*
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Cudby, Joseph William, to United States Steel Corporation. Pouring of metals. 4,003,561, Cl. 266-220.000.

Cullen, Roy H.; Jackson, Joshua M.; Witovek, Jim, Jr.; and Jones, Terry V., to General Electric Company, by said Joshua M. Jackson and Jim Witovak, Jr. Method and apparatus for deployment and retrieval of fixed lengths of electrical cable into and from a well bore. 4,003,435, Cl. 166-315.000.

Cullen, Roy H.; Jackson, Joshua M.; and Jones, Terry V., to General

Electric Company, by said Joshua M. Jackson and said Terry V. Jones. Electrical cable reeling apparatus. 4,003,456, Cl. 191-12.400.
Curtin, Daniel J.: *See—*
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Curtis, Douglas R. Linear/logarithmic analog multiplier. 4,004,141, Cl. 235-194.000.
Custer, Walter D.: *See—*
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Czajkowski, Albert J.; and Schafer, David E., to Monsanto Company. Compositions and methods for reducing herbicidal injury. 4,003,735, Cl. 71-101.000.
D. G. O'Brien, Inc.: *See—*
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Fannin, Richard C., to Bendix Corporation, The. Fluid pressure braking system with limiting valve for anti-compounding and fail-safe standby valve. 4,003,605, Cl. 303-6.00M.
Fano, Joseph D.; and Hwa, Fu. Sanitary waste receiver. 4,003,595, Cl. 294-19.00R.
Farmer, Everett W.: *See—*
Woodruff, Thomas E.; Ballard, Samuel S.; Saunders, Roger I.; and Farmer, Everett W., 4,004,265.
Farrar, Ralph C., to Phillips Petroleum Company. Viscosity reduction of organopolylithium-initiated polymer solutions. 4,004,070, Cl. 526-86.000.
Farrelly, Walter M., to Vac-Pac Manufacturing Co. Apparatus for producing a package of imbricated bags. 4,003,782, Cl. 156-552.000.
Faust, Ellsworth E.: *See—*
Costanza, John R.; and Faust, Ellsworth E., 4,003,871.
Fazio, Dominick S.: *See—*
Wu, Paul S.; and Fazio, Dominick S., 4,003,627.
Feck, Norman L.: *See—*
Kuzara, James H.; Feck, Norman L.; and Johnston, Vincent P., 4,003,340.
Fedorov, Sergei Alexandrovich: *See—*
Tishkov, Anatoly Yakovlevich; Fedorov, Sergei Alexandrovich; Freidin, Anatoly Markovich; Latyshev, Mikhail Zakharovich; Grigoriev, Vitaly Markovich; Menshikov, Jury Alexeevich; Bovin, Andrei Andreevich; Kreimer, Vladimir Isaakovich; Chekushkin, Viktor Ananievich; Lumpov, Vladimir Petrovich; and Alexeev, Dmitry Semenovich, 4,003,831.
Feichtinger, Hans: *See—*
Kluy, Werner; Feichtinger, Hans; and Falbe, Jurgen, 4,003,921.
Feinberg, Joseph George: *See—*
Mill, Patrick James; Cresswell, Michael Alan; and Feinberg, Joseph George, 4,003,792.
Feldman, Daniel P. Self-steering apparatus for sailboats. 4,003,328, Cl. 114-144.00R.
Fenco Corporation: *See—*
Chiodini, Fernando, 4,004,116.
Fenske, Edward F.; and Smith, Robert P. Anti-corrosive insert for sucker rod couplings. 4,003,669, Cl. 403-288.000.
Fernstrom, George Arvid; and Osborn, James Richard, Jr., to Du Pont de Nemours, E. I., and Company. Filamentary tow packaging method. 4,003,195, Cl. 57-157.00F.
Ferranti, Limited: *See—*
Clarke, Graham Morley, 4,004,239.
Fettes, Donald G.: *See—*
Fleckenstein, Andrew Joseph; Mitchell, Herman C.; and Fettes, Donald G., 4,003,710.
Fichtel & Sachs A.G.: *See—*
Wossner, Felix, 4,003,454.
Fickel, R. Gene, to UOP Inc. Method for controlling heat input to the reboiler section of a distillation column. 4,003,799, Cl. 203-2.000.
Fidler, Fred: *See—*
Beveridge, John; Davies, Thomas Roderick Harries; Fidler, Fred; and Ring, Maurice Frank, 4,003,492.
Filderman, Rene, to Societe Anonyme Francaise du Ferodo. Constant velocity universal joint. 4,003,218, Cl. 64-21.000.
File, James R., to File, James R.; Slate, Henry; and Takiff, Jack, part interest to each. Ear attachable miniaturized radio receiver. 4,004,229, Cl. 325-361.000.
Findlay, Allan Cameron, to Reeves Brothers Inc. Convolute foam package. 4,003,469, Cl. 206-410.000.
Finger, John F., to Sioux Steam Cleaner Corporation. Drip-preventing condensation shroud usable with water heaters. 4,003,407, Cl. 138-103.000.
Fink, Leonard. Inflatable crib. 4,003,098, Cl. 5-93.00R.
Fink, Robert H., to United States of America, Army. Reverse flow reaction control system. 4,003,531, Cl. 244-3.220.
Finsterwalder, Ulrich, to Dyckerhoff & Widmann Aktiengesellschaft, Firma. Monolithic ship's body of steel concrete or prestressed concrete. 4,003,327, Cl. 114-65.00A.
Firestone Tire & Rubber Company, The: *See—*
Claxton, William Eugene; Gardner, James Dennis; and Janssen, Marvin Lynn, 4,004,270.
Claxton, William Eugene; and Cernik, Bruce Milan, 4,004,272.
Firm C. Conradty: *See—*
Sieberer, Karl-Heinz, 4,003,808.
Firmenich S.A.: *See—*
Sundt, Erling, 4,003,935.
Fischer, Boguslav H. Low pressure hyperbaric chamber. 4,003,371, Cl. 128-184.000.
Fischer, Edward J. Anti-syphon device for a water supply line. 4,003,399, Cl. 137-592.000.
Fischer & Porter Co.: *See—*
Herzl, Peter J., 4,003,251.
Yard, John S.; Herzl, Peter J.; and Evans, Daniel, 4,003,253.
Fishburn, Clarence H. Dispenser for rolls of flexible sheet material. 4,003,526, Cl. 242-55.300.
Fisher, Dennis Glendon: *See—*
Vossen, John L., Jr.; Nyman, Frederick Russell; Fisher, Dennis Glendon; and Nichols, George Frederick, 4,004,080.
Fisher, William F., to Bird Machine Company, Inc. Method of making centrifuge conveyor. 4,003,115, Cl. 29-156.80R.
Fishman, Jack, to Lewenstein, Evalina; and Henry Hirsch and Stanley Rothschild, trustees. Long-acting local subcutaneously-applied anesthetics and compositions containing the same. 4,004,025, Cl. 424-308.000.

Fleck, Fritz: *See—*
Bolton, Ivan Joseph; Mercer, Alec Victor; and Fleck, Fritz, 4,003,889.

Fleckenstein, Andrew Joseph; Mitchell, Herman C.; and Fettes, Donald G., to L. W. Fleckenstein, Inc. Chemical feeder for water softeners. 4,003,710, Cl. 23-267.00R.

Fleischmann, Lewis W. Proportional control closed circuit gas admission system. 4,003,396, Cl. 137-83.000.

Fletcher, Wade D.; and Sansbury, Jerry F., to Sonoco Products Company. Overcapping apparatus. 4,003,117, Cl. 29-809.000.

Fleury, Jacques, to Societe Anonyme Automobiles Citroen. Servosteering control systems for vehicles. 4,003,446, Cl. 180-132.000.

Flood, Robert W.: *See—*
Kumpf, Sherman S.; and Flood, Robert W., 4,003,281.

Florida Board of Regents: *See—*
Schwartz, Martin Alan, 4,003,903.

Fluoroware Systems Corporation: *See—*
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FMC Corporation: *See—*
Brolin, Charles A., 4,003,475.
Carter, Robert M., 4,003,608.
Garrett, Michael R.; and Krenek, Michael J., 4,003,434.
Manganaro, James L.; and Carlson, Ronald H., 4,003,899.
Mencacci, Samuel A.; Strasser, Jurgen H.; and Mansfield, Tom, 4,003,302.
Robinson, Horace John, 4,003,329.

Focke, Heinz; and Liedtke, Kurt, to Focke & Pfuhl. Pack consisting of a foldable blank, more particularly a cigarette pack and a device for closing the same. 4,003,467, Cl. 206-273.000.

Focke & Pfuhl: *See—*
Focke, Heinz; and Liedtke, Kurt, 4,003,467.

Foglino, Giorgio; Battain, Alfio; and Cappucciati, Raffaello, to Superga S.p.A. Device for closing inlet and outlet ports of a tunnel autoclave. 4,003,714, Cl. 23-290.000.

Foley, Kevin M.; Dewhurst, Harold A.; and McCombs, Frank P., to Owens-Corning Fiberglas Corporation. Wall construction. 4,003,173, Cl. 52-309.170.

Forbro Design Corporation: *See—*
Nercessian, Sarkis, 4,004,155.

Forch, Friedrich: *See—*
Broeckl, Heinz; Forch, Friedrich; Freudenschuss, Otto; Keznickl, Eduard; Patels, Gottfried; and Rollenitz, Leopold, 4,003,645.

Ford Motor Company: *See—*
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Forney, George D., Jr.: *See—*
Qureshi, Shahid U. H.; and Forney, George D., Jr., 4,004,226.

Forsman, Bert E.: *See—*
Foster, Philip C.; and Forsman, Bert E., 4,003,436.

Foster, Elton Gordon; Golding, Robert A.; and Dodd, Delwin E., to Shell Oil Company. Direct hydration of olefins to alcohols. 4,003,952, Cl. 260-641.000.

Foster, Philip C.; and Forsman, Bert E., to Black and Decker Manufacturing Company, The. Oscillatory cultivator. 4,003,436, Cl. 172-41.000.

Fox, Richard: *See—*
Hay, David Gilbert; and Fox, Richard, 4,003,429.

Francesville Drain Tile Corporation: *See—*
Overmyer, Richard C.; and Guerra, Mario, 4,003,122.

Franco, Jack R.; Havas, Janos; and Rompala, Lewis J., to International Business Machines Corporation. Method for forming patterned films utilizing a transparent lift-off mask. 4,004,044, Cl. 427-43.000.

Franz, John E., to Monsanto Company. Dicarboximido-N-phenylsubstituted carbamates and derivatives. 4,003,912, Cl. 260-326.400.

Freeman, John M., Jr.: *See—*
Wiegand, James B.; and Freeman, John M., Jr., 4,003,365.

Freidin, Anatoly Markovich: *See—*
Tishkov, Anatoly Yakovlevich; Fedorov, Sergei Alexandrovich; Freidin, Anatoly Markovich; Latyshev, Mikhail Zakharovich; Grigoriev, Vitaly Markovich; Menshikov, Jury Alexeevich; Bovin, Andrei Andreevich; Kreimer, Vladimir Isaakovich; Chekushkin, Viktor Ananievich; Lumpov, Vladimir Petrovich; and Alexeev, Dmitry Semenovich, 4,003,831.

Freudenschuss, Otto; Kantner, Otto; and Revy von Belvard, Peter, to Vockenhuber, Karl; and Hauser, Raimund. Motion-picture camera accommodating silent-film and sound-film cassettes. 4,003,643, Cl. 352-14.000.

Freudenschuss, Otto; and Kittag, Gerd, to Vockenhuber, Karl; and Hauser, Dennis. Cine cameras. 4,003,646, Cl. 352-141.000.

Freudenschuss, Otto: *See—*
Broeckl, Heinz; Forch, Friedrich; Freudenschuss, Otto; Keznickl, Eduard; Patels, Gottfried; and Rollenitz, Leopold, 4,003,645.

Frey, Otto, to Sulzer Brothers Limited. Wrist joint endoprosthesis. 4,003,096, Cl. 3-1.910.

Fritsch, Werner: *See—*
Stache, Ulrich; Radscheit, Kurt; Fritsch, Werner; Haede, Werner; and Lindner, Ernst, 4,003,997.

Frye, Bruce J. Article holding device. 4,003,538, Cl. 248-467.000.

Fuchs, Dieter. Caster with rotating closure. 4,003,506, Cl. 222-555.000.

Fuji Photo Film Co., Ltd.: *See—*
Akashi, Goro; Fujiyama, Masaaki; and Kasuga, Akira, 4,003,743.
Masuda, Takao; and Sekikawa, Nobuyoshi, 4,003,749.
Ogata, Yasuhiro; and Ariyasu, Kenji, 4,003,245.
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Fujiwara, Takao: *See—*
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Fujiyama, Masaaki: *See—*
Akashi, Goro; Fujiyama, Masaaki; and Kasuga, Akira, 4,003,743.

Fukunaga, Tadamichi, to Du Pont de Nemours, E. I., and Company. Substituted trimethylene cyclopropanes, salts thereof, intermediates and methods of making the same. 4,003,943, Cl. 260-465.00H.

Fukushima, Masami: *See—*
Nakao, Hideo; Arakawa, Masao; and Fukushima, Masami, 4,003,901.

Fulcher, Edwin Maxwell: *See—*
Hannan, William James; Fulcher, Edwin Maxwell; Rhodes, Randy Deleon; and Saenz, Robert George, 4,004,133.

Fulton, Loyd R. Combination tailgate and loading ramp. 4,003,483, Cl. 214-85.000.

Furucz, Istvan. Carburetion system for internal combustion motor. 4,003,357, Cl. 123-127.000.

Furuhata, Takashi: *See—*
Yumde, Yasufumi; Furuhata, Takashi; and Kawamura, Kotaro, 4,004,082.

Furuya, Toshihiro: *See—*
Sato, Seishiro; Furuya, Toshihiro; and Saito, Yasushi, 4,004,149.

Fuveau S.A.: *See—*
Moreau, Michele; Karadavidoff, Isaac; and Risse, Claude, 4,003,931.

G. D. Searle & Co.: *See—*
Adelstein, Gilbert W., 4,003,904.
Pappo, Raphael; and Polk, Rothwell, 4,003,996.

Gaines, Donald R.; Smallegan, Jon M.; and Trudeau, William H., to Gulf & Western Manufacturing Company. Ball joint assembly. 4,003,666, Cl. 403-36.000.

Gaines, Donald R.; Smallegan, Jon M.; and Trudeau, William H., to Gulf & Western Manufacturing Company. Lubricatable ball joint assembly. 4,003,667, Cl. 403-36.000.

Gallet, Jean; Marine, Jean; Pelliciari, Bernard; and Schaub, Bernard, to Commissariat a l'Energie Atomique. Method of preparation of semiconducting compounds. 4,003,741, Cl. 75-135.000.

Gallone, Patrizio: *See—*
Bianchi, Giuseppe; de Nora, Vittorio; Gallone, Patrizio; and Nidola, Antonio, 4,003,817.

Gamell, Joseph A., to Joseph Gamell Industries, Incorporated. Internal combustion engine having coaxially mounted compressor, combustion chamber, and turbine. 4,003,672, Cl. 415-71.000.

Ganssmantel, Horst, to Licentia Patent-Verwaltungs-G.m.b.H. Method for synchronizing the pulse frames in time multiplex data transmission via communication satellites. 4,004,225, Cl. 325-4.000.

Gardner, James Dennis: *See—*
Claxton, William Eugene; Gardner, James Dennis; and Janssen, Marvin Lynn, 4,004,270.

Garibaldi, Pierpaolo; and Calderazzo, Fausto, to Snam Progretti S.p.A. Method for the preparation of ytterbium(III) beta-diketonates. 4,003,937, Cl. 260-429.200.

Garrett Corporation, The: *See—*
Kinsell, Robert C.; Noe, James C.; and Campbell, Carl D., 4,003,212.

Garrett, Michael R.; and Krenek, Michael J., to FMC Corporation. Method and apparatus for running, operating, and retrieving subsea well equipment. 4,003,434, Cl. 166-315.000.

Garrick, John R.; Hager, Nathaniel E., Jr.; and Waters, Ernest B., Jr., to Armstrong Cork Company. Press for embossing ceiling tile. 4,003,306, Cl. 101-27.000.

Gartland, Albert J., Jr., to Harvey Hubbell Incorporated. Locking shroud for electrical connector. 4,003,622, Cl. 339-75.00P.

Gates Rubber Company, The: *See—*
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Gattuso, Marion J., to Universal Oil Products Company. Substituted tetrahydropyrimidines. 4,003,718, Cl. 44-63.000.

Gavril, Bruce D. Switching system for non-symmetrical sharing of computer peripheral equipment. 4,004,277, Cl. 340-172.500.

Gebhard, Richard E., to SEMI. Test system for semiconductor memory cell. 4,004,222, Cl. 324-158.00R.

Geer, Larry A.; and Sheffer, Ralph L., to Adams Rite Products, Inc. Drawer handle with locking mechanism. 4,003,614, Cl. 312-320.000.

Gefri, Fred J.: *See—*
Huggins, Dale K.; Anderson, Lowell R.; and Gefri, Fred J., 4,003,740.

Gehrmann, Klaus: *See—*
Schafer, Stefan; Ohorodnik, Alexander; Gehrmann, Klaus; and Mainski, Albert, 4,003,723.

Geiger, Rolf: *See—*
Konig, Wolfgang; Geiger, Rolf; and Sandow, Jurgen K., 4,003,884.

Geissler, Robert G., to Vitek Electronics, Inc. Transmission line filter. 4,004,257, Cl. 333-73.00C.

General Cable Corporation: *See—*
Main, Harold M., 4,003,610.

General Company, Ltd.: *See—*
Matsushita, Hiromu; Yamahata, Takashi; and Kakimoto, Hiroshi, 4,004,065.

General Dynamics Corporation: *See—*
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General Electric Company: *See—*
Baertsch, Richard D.; Engeler, William E.; and Tiemann, Jerome J., 4,004,157.
Bale, Richard W., 4,003,116.
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Cullen, Roy H.; Jackson, Joshua M.; Witovek, Jim, Jr.; and Jones, Terry V. (said Joshua M. Jackson and Jim Witovak, Jr. assors. to), 4,003,435.
Cullen, Roy H.; Jackson, Joshua M.; and Jones, Terry V. (said Joshua M. Jackson and said Terry V. Jones assors. to), 4,003,456.
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General Motors Corporation: *See—*
Bell, Albert H., III; and Egli, Hans, 4,003,199.
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Geosource Inc.: *See—*
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Gerarde, Horace W., deceased; and by Midlantic National Bank Citizens, executor, The, to Becton, Dickinson and Company. Apparatus for measuring precise micro quantities of fluid samples. 4,003,262, Cl. 73-425.000.

Gerding, Ronald B., to Heil Co., The. Safety apparatus for hydraulic valves in dump body mechanism. 4,003,601, Cl. 298-22.00C.

Gerecht, John Fred; and Epstein, Morton Batlan, to Colgate-Palmolive Company. Highly substantive sunscreening agents. 4,004,074, Cl. 526-305.000.

Gerhard Collardin GmbH: *See—*
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Gerwitz, Paul F.: *See—*
Hogue, Ronald P.; Hill, Robert D., Jr.; and Gerwitz, Paul F., 4,004,264.

Gessner A.G.: *See—*
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Gewerkschaft Eisenhutte Westfalia: *See—*
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Geyer, Robert P.: *See—*
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Gibson, David Vincent; and Leary, Bruce, to Dulux Australia Ltd. Polymeric thickeners. 4,003,870, Cl. 260-29.6RW.

Gibson, John Phillip: *See—*
Chalmers, Brian John; and Gibson, John Phillip, 4,004,203.

Giffard, Robin P., to S.H.E. Corporation. Flux locked loop. 4,004,217, Cl. 324-43.00R.

Gilano, Michael N.: *See—*
Lipson, Melvin A.; Knoth, Dale W.; Custer, Walter D.; and Gilano, Michael N., 4,003,877.

Gilb, Tyrell T., to Simpson Manufacturing Co., Inc. Truss hanger. 4,003,179, Cl. 52-696.000.

Gilbert, Everett E., to United States of America, Army. Purification of TNT with magnesium sulfite-bisulfite mixtures. 4,003,953, Cl. 260-645.000.

Gilbert, Jeffrey F.: *See—*
Clarke, E. Colin W.; Gilbert, Jeffrey F.; and Glew, David N., 4,003,816.

Gilbert, Max I. Cricothyrostomy instrument. 4,003,381, Cl. 128-305.300.

Gilligan, William H.; and Hall, Thomas N., to United States of America, Navy. Removal of tetranitromethane from TNT plant waste gases. 4,003,977, Cl. 423-236.000.

Girling Limited: *See—*
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Girvan, William A.: *See—*
Kenigsberg, Irwin J.; Girvan, William A.; and Abbe, Jerome T. L., 4,003,534.

Gist-Brocades N.V.: *See—*
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Verweij, Jan; Tan, Hong Sheng; and Kooreman, Hermanus Jacobus, 4,003,894.

Givaudan Corporation: *See—*
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Glass, Marvin I.; and Schoenfield, Palmer J., to Marvin Glass & Associates. Convertible flashlight-lantern. 4,004,132, Cl. 240-10.630.

Glatthorn, Raymond H.: *See—*
Hood, Ben B.; and Glatthorn, Raymond H., 4,004,125.

Glaze, Thurman A., to Masiello, Grace M., a part interest. Chair mounted tray. 4,003,598, Cl. 297-194.000.

Glew, David N.: *See—*
Clarke, E. Colin W.; Gilbert, Jeffrey F.; and Glew, David N., 4,003,816.

Glockler, Otto: *See—*
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Gloucester Engineering Co. Inc.: *See—*
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Goddard, Steven Jerome, to Du Pont de Nemours, E. I., and Company. Herbicidal 2-arylaminocarbonyl-1-cyclohexene-1-carboxylic acids and salts thereof. 4,003,926, Cl. 260-518.00A.

Goff, Otis Ward. Caser apparatus. 4,003,185, Cl. 53-61.000.

Goins, Mack. Method for cutting pipe. 4,003,433, Cl. 166-298.000.

Goldberg, Albert T.: *See—*
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Goldberg, Estelle: *See—*
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Golding, Robert A.: *See—*
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Goldstein, Jerome J., to Aquafilter Corporation. Cigarette filter holder. 4,003,387, Cl. 131-173.000.

Gomann, Jurgen: *See—*
Adebahr, Klaus; and Gomann, Jurgen, 4,003,385.

Gomm, Walter, to Bayer Aktiengesellschaft. Process for the manufacture of cationic dyestuffs. 4,003,898, Cl. 260-247.10L.

Gompert, Leon T., to Rockwell International Corporation. Servoed indicating apparatus. 4,004,206, Cl. 318-636.000.

Good, John P.: *See—*
Good, Palmer W.; Good, John P.; and Hinz, Paul R., 4,004,143.

Good-Lite Company: *See—*
Good, Palmer W.; Good, John P.; and Hinz, Paul R., 4,004,143.

Good, Palmer W.; Good, John P.; and Hinz, Paul R., to Good-Lite Company. Medical and dental lamp. 4,004,143, Cl. 240-44.150.

Goodyear Aerospace Corporation: *See—*
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Goodyear Tire & Rubber Company, The: *See—*
Rabito, Thomas G.; Kieft, Alvin J.; and Cline, Richard L., 4,004,050.
Sandstrom, Paul H.; and Lal, Joginder, 4,003,420.

Gootjes, Johan, to Gist-Brocades N.V. Aminoalkylethers. 4,003,932, Cl. 260-570.00R.

Goren, Robert Nathan; Streifer, William; and Marks, Lawrence Morton, to Xerox Corporation. Electrophotographic halftone printing machine employing a phase screen. 4,003,649, Cl. 355-4.000.

Gorog, Istvan, to RCA Corporation. Optical communication and display system. 4,004,078, Cl. 358-83.000.

Gorsich, Richard D.; and DeWitt, William J., to Ethyl Corporation. Concentrated aqueous olefins sulfonates containing carboxylic acid salt anti-gelling agents. 4,003,857, Cl. 252-546.000.

Goshima, Takeshi; and Endo, Kiyonobu, to Canon Kabushiki Kaisha. Linear image forming apparatus. 4,003,636, Cl. 350-162.00R.

Goto, Akio; Okamoto, Shigenori; Asakawa, Shigeru; and Sugiyama, Fumio, to Tokyo Shibaura Electric Co., Ltd. Bit synchronization circuit. 4,004,090, Cl. 178-69.100.

Gotta, Hans; and Schroll, Franz-Heinz, to Gerhard Collardin GmbH. Process for the production of sprayed phosphate coats on iron and steel. 4,003,761, Cl. 148-6.15R.

Gotz, Laszlo: *See—*
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Goytisolo Taltavull, Ignacio. Nil-luminance lighting panel. 4,004,145, Cl. 240-106.00R.

Grable, Michael Anthony, to Hercules Incorporated. Method of preparing graphite fibers of ultra-short length and narrow size distribution. 4,003,773, Cl. 156-155.000.

Graeff, Barry Lee: *See—*
Haehnel, Rudolf Herbert; and Graeff, Barry Lee, 4,003,290.

Grahame, Robert E., Jr.: *See—*
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Grammer, Don O'Neil: *See—*
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Grandes Malteries Modernes: *See—*
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Grant Hardware Company: *See—*
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Graser, Earl J., to Olinkraft, Inc. Frozen food tray. 4,003,514, Cl. 229-34.0HW.

Graser, Michael, Jr.; and Bilotta, Vincent Francis, to Technical Operations Incorporated. Optical control assembly for a color design viewer. 4,003,634, Cl. 350-162.0SF.

Gray, Darby A.; and Hall, Roger L., to Honeywell Information Systems, Inc. Type ribbon deskewing means for a type ribbon feed apparatus. 4,003,460, Cl. 197-170.000.

Gray, Frederick William; and Jervert, Jon C., to Colgate-Palmolive Company. Cleaning fabrics. 4,003,700, Cl. 8-111.000.

Grebik, Stephen J.: *See—*
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Greczin, John C., to Knitting Machinery Corporation of America. Knitting machine including rotatable hold down ring. 4,003,220, Cl. 66-9.00A.

Green, Charles B.: *See—*
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Green, Howard, to Massachusetts Institute of Technology. Triglyceride-accumulating clonal cell line. 4,003,789, Cl. 195-1.800.

Greene, Marvin: *See—*
Pelofsky, Arnold H.; and Greene, Marvin, 4,003,820.

Grier, Nathaniel; and Dybas, Richard A., to Merck & Co., Inc. Di-bicyclo[3.1.1] and [2.2.1]heptyl and di-bicyclo[3.1.1] and [2.2.1]heptenyl ketones. 4,003,934, Cl. 260-586.00G.

Griffone, Lawrence P.: *See—*
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Grigoriev, Vitaly Markovich: *See—*
Tishkov, Anatoly Yakovlevich; Fedorov, Sergei Alexandrovich; Freidin, Anatoly Markovich; Latyshev, Mikhail Zakharovich; Grigoriev, Vitaly Markovich; Menshikov, Jury Alexeevich; Bovin, Andrei Andreevich; Kreimer, Vladimir Isaakovich; Chekushkin, Viktor Anatievich; Lumpov, Vladimir Petrovich; and Alexeev, Dmitry Semenovich, 4,003,831.

Grillmeier, Eugene L.: *See—*
Richard, Harold S.; Grillmeier, Eugene L.; Gross, Jack R.; and Myers, Robert P., 4,004,089.

Grise, Frederick Gerard Joseph; and Lovell, Walter Carl, to USM Corporation. Can cover openable by a spoon or the like. 4,003,495, Cl. 220-268.000.

Grisik, John J., to General Electric Company. Diffusion coating method. 4,004,047, Cl. 427-142.000.

Gristina, Anthony G., to Howmedica, Inc. Trispherical prosthetic shoulder device. 4,003,095, Cl. 3-1.910.

Griswold, Augustus W.; Haritonoff, Boris W.; and Westkirk, Angus W., to Dynak, Inc. Microfiche mounter. 4,003,779, Cl. 156-353.000.

Grobman, William, to Molins Machine Company, Inc. Apparatus having dual slotter shafts. 4,003,300, Cl. 93-58.20R.

Groome, Ernest J.; and Hamrick, Henry L., to Clupak, Inc. Method for compacting a nonwoven fabric impregnated with a thermoplastic binder. 4,003,783, Cl. 162-168.00R.

Groothuis, Gerrit Jan, to U.S. Philips Corporation. Dry-shaving apparatus with reciprocatable cutting block. 4,003,131, Cl. 30-43.920.

Gross, Frank C., to A.B. Dick/Scott. Apparatus for making electrical contact with an electrophotographic film. 4,003,648, Cl. 355-3.00R.

Gross, Franz, to Siemens Aktiengesellschaft. Traveling wave tube with rectangular coupling waveguides. 4,004,180, Cl. 315-3.500.

Gross, Jack R.: *See—*
Richard, Harold S.; Grillmeier, Eugene L.; Gross, Jack R.; and Myers, Robert P., 4,004,089.

Grossman, Abraham. Solar panel construction. 4,003,363, Cl. 126-270.000.

Groupement D'Interet Economique Tepral: *See—*
Delhaye, Alain; Moll, Manfred M.; and Pollock, James R., 4,004,034.

Groupement pour les Activities Atomiques et Advancees "GAAA": *See—*
Carbonnel, Henri, 4,003,560.

Grove, Leroy K. Electromagnet for providing balanced friction face pressures on an armature in a vehicle electric brake system. 4,004,262, Cl. 335-281.000.

Grubhofer, Norbert: *See—*
Lohr, Walter; Grubhofer, Norbert; Sohmer, Inge; and Wittekind, Dietrich, 4,003,892.

Grumman Aerospace Corporation: *See—*
Leinoff, Sidney; Edelstein, Frederick; and Combs, Walter, 4,003,427.

GRUNDIG E.M.V. Elektro-Mechanische Versuchsanstalt Max Grundig: *See—*
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GTE Laboratories Incorporated: *See—*
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Guerra, Mario: *See—*
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Guerrero, Benjamin Guzman, to Mattel, Inc. Sneezing doll improvement. 4,003,157, Cl. 46-118.000.

Gulbenk, Alin H., to Dow Chemical Company, The. Substituted pyridinyl methylthio or (methylsulfonyl)benzeneamines. 4,003,906, Cl. 260-294.80F.

Gulf Research & Development Company: *See—*
Bacha, John D.; and Selwitz, Charles M., 4,003,800.

Gulf & Western Manufacturing Company: *See—*
Gaines, Donald R.; Smallegan, Jon M.; and Trudeau, William H., 4,003,666.
Gaines, Donald R.; Smallegan, Jon M.; and Trudeau, William H., 4,003,667.

Gump, Klaus Hannes; and Stuetz, Dagobert Engelbert, to Celanese Corporation. Stabilization of acrylic fibers and films. 4,004,053, Cl. 427-379.000.

Gunion, James F.: *See—*
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Gunter, Wilburn J. Coiler calender rolls. 4,003,104, Cl. 19-150.000.

Gunther, William E. Rotary engine. 4,003,351, Cl. 123-44.00R.

Gunther, Wolfgang H. H., to Xerox Corporation. Preparing waterless lithographic printing masters by ink jet printing. 4,003,312, Cl. 101-466.000.

Guschin, Alexandr Evgenievich; Khokhryakov, Alexandr Andreevich; Pechko, Evgeny Yakovlevich; Obraztsov, Konstantin Ivanovich; Konstantinov, Anatoly Vasilievich; and Alexandrov, Vyacheslav Sergeevich. Apparatus for transforming an air-fibre dispersion stream in the manufacture of homogeneous fibrous materials. 4,003,105, Cl. 19-155.000.

Gustison, Robert Lawrence. Dispersion-hardened lead alloy. 4,003,755, Cl. 429-178.000.

Gutner, Kenneth H. Wall hanging device. 4,003,539, Cl. 248-489.000.

H.L.S. Ltd., Industrial Engineering Company: *See—*
Koslowsky, Ladislav, 4,004,041.

H. Maihak A.G.: *See—*
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Haas, Georges; Jenny, Erwin F.; and Rossi, Alberto, to Ciba-Geigy Corporation. Dicarboxylic acids and derivatives in the treatment of pain and inflammation. 4,004,026, Cl. 424-311.000.

Haas, Ronald J.: *See—*
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Briggs, Donald C.; and Haas, Ronald J., 4,004,068.

Haber, Terry M. Watch monitor. 4,003,197, Cl. 58-50.00R.

Hachmann, Klaus; Puchta, Rolf; and Sperling, Gerhard, to Henkel & Cie G.m.b.H. Coated stabilized bleach activators, process and washing compositions. 4,003,841, Cl. 252-94.000.

Haede, Werner: *See—*
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Haehnel, Rudolf Herbert; and Graeff, Barry Lee, to Rockwell International Corporation. Strand carrier for a strand fabricating machine. 4,003,290, Cl. 87-57.000.

Haffey, John M., Jr. Football game. 4,003,580, Cl. 273-134.0CF.

Hagen, Albert; Kaiser, Theodor; and Pohler, Heinz, to Hoesch Werke Aktiengesellschaft. Method and arrangement for the production of annular articles. 4,003,121, Cl. 29-415.000.

Hager, Nathaniel E., Jr.: *See—*
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Haines, William M., to Gates Rubber Company, The. Power transmission belt. 4,003,269, Cl. 74-229.000.

Hakansson, Hakan: *See—*
Erlandsson, Bengt; Hakansson, Hakan; Salen, Bengt; Nilsson, Per; and Ivarsson, Alf, 4,003,264.

Hall, Daniel N.: *See—*
Mueller, Wolfgang H.; Oswald, Alexis A.; and Hall, Daniel N., 4,003,939.

Hall, Donivan L., to Reliance Electric Company. Digital scale with means to shift displayed weight to show fraction of least normally displayed graduation. 4,004,139, Cl. 235-151.330.

Hall, John C., to Rockwell International Corporation. Electrode structure for electrical energy storage device. 4,003,753, Cl. 429-199.000.

Hall, Roger L.: *See—*
Gray, Darby A.; and Hall, Roger L., 4,003,460.

Hall, Thomas N.: *See—*
Gilligan, William H.; and Hall, Thomas N., 4,003,977.

Hallier, Bernard L. D., to International Standard Electric Corporation. Multi-zone microwave heating apparatus. 4,004,122, Cl. 219-10.55A.

Halligan, Dewey D. Dip lead former. 4,003,414, Cl. 140-1.000.

Hallock, Robert L. Clinch type fastener. 4,003,286, Cl. 85-31.000.

Halperin, Nathaniel, to Zale Corporation. Coarse focus mechanism for microscopes. 4,003,628, Cl. 350-77.000.

Hamada, Osamu. Pulse width modulated signal amplifier. 4,004,246, Cl. 330-10.000.

Hamersma, Willem Antonius Maria: *See—*
van Hattum, Jan Otto; and Hamersma, Willem Antonius Maria, 4,004,177.

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Hammonds, James C.: *See—*
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Hamrick, Henry L.: *See—*
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Hanazono, Masanobu; and Asai, Osamu, to Hitachi, Ltd. Method for preparing thin film integrated circuit. 4,003,772, Cl. 156-656.000.

Haney, James R.; and Ruof, Edgar J., to Goodyear Aerospace Corporation. Failure warning and shut-off for anti-skid system. 4,003,607, Cl. 303-92.000.

Hankinson, Harold D.: *See—*
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Hannan, Daniel: *See—*
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Hannan, Lucille E.: *See—*
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Hannan, William James; Fulcher, Edwin Maxwell; Rhodes, Randy Deleon; and Saenz, Robert George, to RCA Corporation. Credit card containing electronic circuit. 4,004,133, Cl. 235-61.70B.

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Hansen, Siegfried, to Hughes Aircraft Company. Electro-hydraulic driver for deformable face plate. 4,003,640, Cl. 350-310.000.

Hanson, Waldo B.; Morrison, Ralph A.; and Tardiff, Armand L., to USM Corporation. Machines for reforming and repackaging components. 4,003,413, Cl. 140-1.000.

Happach, Anton, to Schaltbau Gesellschaft mbH. Power relay. 4,004,260, Cl. 335-202.000.
Harada, Toshio; Nakamata, Shinichi; Araki, Shiro; Nakashima, Koei; Kawasaki, Hironori; Watanabe, Kazuo; and Miura, Keiichi, to Nippon Steel Corporation; and Mitsubishi Electric Corporation. Method for compensating tail end. 4,003,229, Cl. 72-15.000.
Harayda, George Michael; and Austin, Wayne Miller, to RCA Corporation. Heat-sink assembly for high-power stud-mounted semiconductor device. 4,004,195, Cl. 317-100.000.
Hardt, Jean, to Aluminium Suisse S.A. Relief vent for pressurized cans. 4,003,505, Cl. 222-397.000.
Haring, Rolf A. Liquid outlet valve. 4,003,401, Cl. 137-599.200.
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Harris, James C.: *See—*
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Harris, Melvin: *See—*
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Harrison, Eugene; and Williams, Edgar G., to Celanese Corporation. Die-gap adjusting means. 4,003,689, Cl. 425-466.000.
Harsco Corporation: *See—*
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Harvey, Louis A. Home tennis practice contrivance. 4,003,572, Cl. 273-29.00A.
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Hashida, Yoshisuke; and Hibino, Tsuneo, to Konishiroku Photo Industry Co., Ltd. System for recording images received by facsimile. 4,003,651, Cl. 355-16.000.
Hashimoto, Sho: *See—*
Kumita, Izumi; Ueda, Akiyoshi; Ohkuma, Kazuhiko; Hashimoto, Sho; Nakada, Akira; and Mizuno, Masami, 4,004,022.
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Hattori, Seizi; Inagaki, Nobuo; and Ishii, Yoshikazu, to Nippon Telegraph and Telephone Public Corporation. Method of making a magnetic oxide film with high coercive force. 4,003,813, Cl. 204-192.000.
Hauck, Frederic P.; Cimarusti, Christopher M.; and Sundeen, Joseph E., to E. R. Squibb & Sons, Inc. 2,3-Trans-5-[3-(amino)-2-hydroxypropoxy]-1,2,3,4-tetrahydro-3-(or 2)-amino-2-(or 3)-hydroxy-naphthalenes and salts thereof. 4,003,930, Cl. 260-570.700.
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Hauth, Hartmut; and Tscherter, Hans, to Sandoz Ltd. 3-Pyridylamine substituted ergolines. 4,004,011, Cl. 424-261.000.
Havas, Janos: *See—*
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Haven, Harold A.; and Stewart, John A., to General Motors Corporation. Low tire pressure warning system. 4,004,271, Cl. 340-58.000.
Hawkes, George F., Jr., to Westinghouse Electric Corporation. Panelboard and circuit breaker combination. 4,004,197, Cl. 317-119.000.
Hawks, Herbert H., to Nite Hawk Enterprises, Inc. Aerial mount. 4,003,540, Cl. 248-539.000.
Hawks, Nathaniel L.; and Shively, John R., to Jones, Elmer E. Door and window closer. 4,003,102, Cl. 16-72.000.
Haws, Spencer Kim. Stalk selective harvesting machine. 4,003,193, Cl. 56-327.00A.
Hawthorne, John O.: *See—*
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Hay, David Gilbert; and Fox, Richard, to ICI Australia Limited. Apparatus for loading gas-conveyed particulate solids into a borehole. 4,003,429, Cl. 166-51.000.
Haydon, Arthur W., to Tri-tech, Inc. Electric rotating machine. 4,004,168, Cl. 310-41.000.
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Hayes, John C., to UOP Inc. Dehydrocyclization with an acidic multimetallic catalytic composite. 4,003,955, Cl. 260-673.500.
Hayes, John C.: *See—*
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Hayes, William F.; Tanney, John W.; and Tucker, Helen G., to Canadian Patents and Development Limited. Apparatus for regulating the flow rate of a fluid. 4,003,405, Cl. 138-40.000.
Hays, Bill J. Flux wheel for breakerless distributor retrofit. 4,003,359, Cl. 123-146.50A.
Heberlein & Co. AG: *See—*
Rebsamen, Albert; and Scherrer, Franz Xaver, 4,003,510.
Hedin, Borje Vilhelm, to Aktiebolaget Motala Verkstad. Press plate having heating means and adapted for use in single-storey or multistorey presses for the manufacture of fibreboard, chipboard, laminarboard and the like. 4,003,687, Cl. 425-406.000.
Heeren, Richard H., to Teletype Corporation. Binary voltage-differential sensing circuits, and sense/refresh amplifier circuits for random-access memories. 4,004,284, Cl. 340-173.0DR.
Hefel, Walter. Fluid-tight flange coupling and method of making the same. 4,003,590, Cl. 285-336.000.
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Heilos, Johannes; Heimberger, Werner; Lussling, Theodor; and Weigert, Wolfgang, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process of preparing dicyan. 4,003,983, Cl. 423-384.000.
Heim, Albert; and Baroni, Fausto, to Clupak, Inc. Method of lubricating resilient belt during web compaction. 4,003,784, Cl. 162-199.000.
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Heinz, Theodore A.; and Dunn, Charlton, III, to United States of America, Navy. Low distortion high energy laser mirror. 4,003,641, Cl. 350-310.000.
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Helm, Herbert W., to F. L. Smithe Machine Company, Inc. Method of enclosing insert material in a continuously advancing envelope blank. 4,003,183, Cl. 53-31.000.
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Henke, John David, to International Business Machines Corporation. MOSFET latching driver. 4,004,170, Cl. 307-279.000.
Henkel & Cie G.m.b.H.: *See—*
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Herlacher, Richard E., to International Telephone and Telegraph Corporation. Telephone circuit to eliminate use of a hold button. 4,004,107, Cl. 179-99.000.
Herz, Andre, to Minigrip, Inc. Method of extruding tubing for fastener bags. 4,003,972, Cl. 264-40.300.
Herzl, Peter J., to Fischer & Porter Co. Acceleration-proof vortex-type flowmeter. 4,003,251, Cl. 73-194.0VS.
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Heseltine, Donald W.; Kurtz, Donald W.; Chapman, Derek D.; and Elwood, James K., to Eastman Kodak Company. Silver halide emulsion containing photographic sensitizing dyes. 4,003,750, Cl. 96-129.000.
Hesler, Joseph P.; and Korzekwa, Samuel M., to General Electric Company. Inverter transformer. 4,004,251, Cl. 331-113.00A.
Hess, Charles W., to Speco, Inc. Dual-phase meat grinder adapter. 4,003,521, Cl. 241-82.400.
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Hetke, Adolf; Mohla, Prem P.; and Warrick, Robert J., to Ford Motor Company. Method of making ductile iron treating agents. 4,003,424, Cl. 164-34.000.

Heunks, Antonius M. A., to Stamicarbon N.V. Process for the preparation of urea. 4,003,928, Cl. 260-555.00A.

Heuvelmans, Jean Johan; van Tongeren, Hendricus Franciscus Joannes Jacobus; and Van der Werf, Jan Evert, to U.S. Philips Corporation. Gas-and/or vapor discharge lamp. 4,004,171, Cl. 313-15.000.

Hewitt, Martin: *See—*
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Heywang, Walter, to Siemens Aktiengesellschaft. System for the formulation and transmission of coordinate information to reproduce handwritten items. 4,004,088, Cl. 178-18.000.

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Hicks, Kevin Joseph, to Auto-Bake Pty. Limited. Food processing oven. 4,004,129, Cl. 219-388.000.

Hilfman, Lee, to UOP Inc. Hydroprocessing aromatics to cycloparaffins. 4,003,956, Cl. 260-667.000.

Hill, Howard W.; and Hassall, Ronald E., to Dow Chemical Company, The. Safe method for thermal decomposition of nitrogen trichloride. 4,003,982, Cl. 423-351.000.

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Hiraoka, Hiroyuki, to International Business Machines Corporation. Nitrated polymers as positive resists. 4,004,043, Cl. 427-43.000.

Hirata, Fumio: *See—*
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Hirayama, Chikara: *See—*
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Hirtsiefer, Karl-Richard. Sun and planet gear transmission mechanism particularly for power wrenches. 4,003,274, Cl. 74-768.000.

Hirzel, Rudolph W.; Olmstead, Albert W.; and Howard, Winship C., to Kellogg Company. Method and apparatus for producing lapped shredded food articles. 4,004,035, Cl. 426-275.000.

Hishinuma, Yukio; Akimoto, Hidetoshi; Tamura, Zensuke; and Nakajima, Fumito, to Hitachi, Ltd. Apparatus for elimination of nitrogen oxides from combustion waste gases. 4,003,711, Cl. 23-288.00F.

Hitachi Electronics, Ltd.: *See—*
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Hitachi, Ltd.: *See—*
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Hivko, Stephen. Boat hull with grab rails on its underside. 4,003,099, Cl. 9-1.600.

Hobbs, James D. Amusement and exercise device. 4,003,575, Cl. 273-95.00A.

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Hodgson, Stanley Cyril, to Tank Sapp (UK) Ltd. Automatic control system. 4,003,342, Cl. 122-448.00R.

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Holt, Barrie; and Barlow, Jeremy Peter, to Henry Simon Limited. Apparatus for transporting bundles of flat articles. 4,003,463, Cl. 198-374.000.

Holter, Heinz. Process and arrangement for the removal of impurities from gases. 4,003,722, Cl. 55-68.000.

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Horii, Hideharu; and Orimoto, Tadashi, to Mitsui Shipbuilding and Engineering Co., Ltd. Apparatus for assembling hull modules for shipbuilding. 4,003,326, Cl. 114-65.00R.

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Houben, Heinz; and Pabst, Manfred, to A. Monforts. Device for determining the mixing ratio of binary gases. 4,003,242, Cl. 73-24.000.

Hoves, Hans; Kunath, Paul; and Uttelbach, Herbert. Method for regulating the material supply to a processing machine having an electric drive motor. 4,004,204, Cl. 318-472.000.

Howard, Philip E.; Kim, James C.; and Sippach, Hans G., to General Electric Company. Accumulation mode charge injection infrared sensor. 4,004,148, Cl. 250-370.000.

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Jaggard, William; and Scales, Allen A., to Dow Chemical Company, The. Gel-like composition for use as a pig in a pipeline. 4,003,393, Cl. 137-15.000.
Janiszewski, Kasimir. Die set with two-part leader pins and ball bearing guide. 4,003,283, Cl. 83-637.000.
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Kemp, Robert T., Jr., to United States of America, Navy. Self-limiting chemical systems for nonpolluting control of noxious pests. 4,004,000, Cl. 424-200.000.
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Klingenberg, Alfred Simeon, to Bell Telephone Laboratories, Incorporated. Connection device. 4,004,261, Cl. 335-280.000.
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Kurokawa, Kazuhiko; and Kanou, Teruchika, to Kabushiki Kaisha Kohjin. Process and apparatus for producing sheet film from tubular thermoplastic resin film. 4,003,973, Cl. 264-101.000.

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Large, George B.; and Pitt, Leland S., to Stauffer Chemical Company. Phosphorus containing insecticide activators. 4,004,001, Cl. 424-200.000.

Lasater, Donald A., to Dover Corporation. Liquid dispensing nozzle having vapor recovery and sealing arrangement. 4,003,415, Cl. 141-59.000.

Laskey, Ben G., to Benruth Engineering & Manufacturing Company, Inc. Press Loader. 4,003,476, Cl. 214-1.0BB.

Laskody, Jerome R., to Boeing Company, The. Thrust correlated engine pressure ratio indicator and method for turbofan engines with mixer-type nozzles. 4,003,249, Cl. 73-117.400.

Latour, Marc Rene, to International Telephone and Telegraph Corporation. Electrical switch assembly for a printed circuit board. 4,004,119, Cl. 200-158.000.

Latta, Michael D.: *See—*
Menke, Kenneth W.; and Latta, Michael D., 4,004,274.

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Lau, Erwin M., to Black Products Company. Valve bag filler, handling and sealing system. 4,003,188, Cl. 53-126.000.

Lawson, Harry W., Jr., to Xerox Corporation. Wide range power conversion system. 4,004,209, Cl. 321-2.000.

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Lear Siegler, Inc.: *See—*
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Leclere, Ralph Joseph: *See—*
Andrews, Donald Richard; and Leclere, Ralph Joseph, 4,003,569.

Lee, Ivan A., to C & K Components, Inc. Switch bezel with visual indicator. 4,004,120, Cl. 200-310.000.

Lee, Roy C., to Phillips Petroleum Company. Method and apparatus for maintaining the operating temperature in a device for reducing engine exhaust pollutants. 4,003,343, Cl. 123-3.000.

Leichle, Claude, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Faulty combustion device for controlled ignition internal combustion engine. 4,003,248, Cl. 73-116.000.

Leinoff, Sidney; Edelstein, Frederick; and Combs, Walter, to Grumman Aerospace Corporation. Heat pipe fabrication. 4,003,427, Cl. 165-105.000.

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LeMere, Roger: *See—*
Crawford, Douglas J.; LeMere, Roger; and Hughes, Francis H., 4,003,323.

Lempicki, Alexander: *See—*
Riseberg, Leslie A.; Lempicki, Alexander; Brecher, Charles; and Dressel, Herman O., 4,004,178.

Lener, Joseph H. Fireplace. 4,003,362, Cl. 126-121.000.

Lennox, Alan Francis; and Rose, John Brewster, to Imperial Chemical Industries Limited. Polyamides. 4,003,879, Cl. 260-49.000.

Lento, Louis Leonard, Jr.: *See—*
Ebel, Robert Henry; and Lento, Louis Leonard, Jr., 4,003,851.

Leo Pharmaceutical Products Ltd. A/S: *See—*
von Daehne, Welf, 4,004,004.

Le Roy, Pierre L., to New Research and Development Lab., Inc. Intracranial pressure monitoring device. 4,003,141, Cl. 35-17.000.

Lerum, Robert David: *See—*
Johnson, Gerald William; and Lerum, Robert David, 4,003,504.

Les Placement Courteau Limitee: *See—*
Potvin, Alfred Marcel, 4,003,967.

Lesher, George Y.; and Opalka, Chester Joseph, to Sterling Drug Inc. 3-Cyano-5-(pyridinyl)-2(1H)-pyridinones. 4,004,012, Cl. 424-263.000.

Leventhal, Stephen Richard. Fingerprint scanning device. 4,003,656, Cl. 356-71.000.

Lever Brothers Company: *See—*
Lamberti, Vincent; and Di Lorenzo, Beth Ann, 4,003,925.

Lewenstein, Evalina: *See—*
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Lewicki, Walter J., Jr.; and Otthofer, Jacob A., Jr., to Armstrong Cork Company. Compressible sleeve embossing roll. 4,003,114, Cl. 29-125.000.

Lewis, Charles A.: *See—*
Vass, Oscar R.; Taylor, Leslie C.; and Lewis, Charles A., 4,003,291.

Lewis, George D.; Mangum, Norman W., Jr.; and Rusnak, James P., to United Technologies Corporation. Variable area flameholder duct. 4,003,201, Cl. 60-262.000.

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Ganssmantel, Horst, 4,004,225.

Liebeskind, Lanny S.: *See—*
Kende, Andrew S.; and Liebeskind, Lanny S., 4,003,916.

Liebscher, Anton; Oberg, Sven; Smathers, Kenneth; and Auberry, Horace, to Ro-Search, Inc. Footwear. 4,003,145, Cl. 36-17.0PW.

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Lightfoot, Daniel J. Solar heat collector module. 4,003,366, Cl. 126-271.000.

Limb, John Ormond: *See—*
Brown, Earl Franklin; Limb, John Ormond; and Prasada, Birendra, 4,004,084.

Lincoln First Bank of Rochester, executor: *See—*
Eichorn, Roger H., deceased; and Lincoln First Bank of Rochester, executor, 4,003,333.

Lindner, Ernst: *See—*
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Lippmann, Wilbur; and Bagli, Jehan F., to Ayerst McKenna and Harrison Ltd. Prostaglandin antagonists. 4,004,027, Cl. 424-317.000.

Lipson, Melvin A.; Knoth, Dale W.; Custer, Walter D.; and Gilano, Michael N., to Dynachem Corporation. Photopolymerizable screen printing inks for permanent coatings prepared from aryloxyalkyl compositions. 4,003,877, Cl. 260-47.0UA.

Lisovoi, Jury Vladimirovich: *See—*
Paton, Boris Evgenievich; Lakomsky, Viktor Iosifovich; Kostyakov, Vladimir Nikolaevich; Shian, Vitaly Mikhailovich; Bukalo, Alfred Iosifovich; Lisovoi, Jury Vladimirovich; and Domrachev, Valentin Petrovich, 4,004,076.

Little, Keith W.; and Millar, Barry C., to Bundy Corporation. Bundling mechanism. 4,003,189, Cl. 53-198.00R.

Litton Business Systems, Inc.: *See—*
Wu, Paul S.; and Fazio, Dominick S., 4,003,627.

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Craig, Robert Jerzy G.; and Council, Clifton Temple, 4,003,265.
Phillips, Robert Matthews, 4,004,179.

Liu, Chao Kai; and Smith, Douglas Charles, to Bell Telephone Laboratories, Incorporated. Path-finding scheme for a multistage switching network. 4,004,103, Cl. 179-18.0EA.

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Lobbe, Armin: *See—*
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Loge, Olaf: *See—*
Skuballa, Werner; Raduchel, Bernd; Vorbruggen, Helmut; Elger, Walter; Losert, Wolfgang; and Loge, Olaf, 4,004,020.

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Lohr, Walter; Grubhofer, Norbert; Sohmer, Inge; and Wittekind, Dietrich, to Serva-Entwicklungslabor v. Grothe & Co. Method of separating thionine and is N-methyl derivatives from each other. 4,003,892, Cl. 260-243.00A.

Lokshin, Efim Lvovich; Volk, Alfei Fedorovich; and Starinsky, Anatoly Antonovich. Method of opening carbon-bearing beds with production wells for underground gasification. 4,003,441, Cl. 175-71.000.

Lone Star Industries, Inc.: *See—*
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Lonza Ltd.: *See—*
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Look, Thomas F.: *See—*
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Losacker, Paul: *See—*
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Losel, Walter; Merz, Herbert; Hoefke, Wolfgang; and Traunecker, Werner, to Boehringer Ingelheim GmbH. α-Acyl derivatives of digitoxin. 4,003,998, Cl. 424-182.000.

Losert, Wolfgang: *See—*
Skuballa, Werner; Raduchel, Bernd; Vorbruggen, Helmut; Elger, Walter; Losert, Wolfgang; and Loge, Olaf, 4,004,020.

Lovell, James Byron: *See—*
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Lovell, Walter Carl: *See—*
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Lowell, Charles, to Wingaersheek, Inc. Fuel delivery system for a hand-held liquid fuel cigarette lighter. 4,003,694, Cl. 431-344.000.

Lubbers, Dietrich W.; and Opitz, Norbert, to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V. Method and arrangement for measuring the concentration of gases. 4,003,707, Cl. 23-232.00R.

Lubowitz, Hyman R., to TRW Inc. Solid grain fuels containing polyphosphonitrilics difluoride for chemical lasers. 4,003,771, Cl. 149-17.000.

Luck, Jack R., to Mentor Products, Inc. Sway resisting structure for trailers. 4,003,586, Cl. 280-446.00B.

Lumpov, Vladimir Petrovich: *See—*
Tishkov, Anatoly Yakovlevich; Fedorov, Sergei Alexandrovich; Freidin, Anatoly Markovich; Latyshev, Mikhail Zakharovich; Grigoriev, Vitaly Markovich; Menshikov, Jury Alexeevich; Bovin, Andrei Andreevich; Kreimer, Vladimir Isaakovich; Chekushkin, Viktor Ananievich; Lumpov, Vladimir Petrovich; and Alexeev, Dmitry Semenovich, 4,003,831.

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Lüthi, Christian; Dünnenberger, Max; and Biland, Hans Rudolf, to Ciba-Geigy Corporation. Asymmetrical oxalic acid diaryl amide stabilizers. 4,003,875, Cl. 260-45.9NC.

Lutzenkirchen, Heinz Dieter, to Trapark i Kiruna Aktiebolag. Electric signal transmitter, preferably for alarm system. 4,004,291, Cl. 340-310.00R.

Lux, Walter Karl; and Chobanov, Tsvetko, to Varta Batterie Aktiengesellschaft. Silver-II-oxide for galvanic elements. 4,003,757, Cl. 429-219.000.

Lybrand, Robert Archie; and Bell, Louis Gary, to A. H. Robins Company, Incorporated. Aspirin-tea coprecipitates for treating inflammation. 4,003,999, Cl. 424-195.000.

Lybrand, Robert Archie; and Bell, Louis Gary, to A. H. Robins Company, Incorporated. Anti-inflammatory agents coprecipitated with ligno-sulfonic acid. 4,004,002, Cl. 424-230.000.

Lyon, Richard K., to Exxon Research and Engineering Company. Isotope separation process. 4,003,809, Cl. 204-157.10R.

MacDonald, James A.: *See—*
MacDonald, Richard A.; MacDonald, James A.; and Andrews, Joseph J., 4,003,574.

MacDonald, Richard A.; MacDonald, James A.; and Andrews, Joseph J., to Thingamajig Corporation. Game ball. 4,003,574, Cl. 273-65.0EC.

Maddestra, Robert; and Munn, David E., to Damon Corporation. Educational block with replaceable chip. 4,003,144, Cl. 35-70.000.

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Maeda, Shigeo: *See—*
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Maeda, Toru: *See—*
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Magerlein, Barney J., to Upjohn Company, The. 4,5-Cis-didehydro-PGF, analogs. 4,003,946, Cl. 260-468.00D.

Magna Motors Corporation: *See—*
Meckling, John H., 4,004,167.

Magnollay, Gilbert, to Maillefer S.A. Closure device. 4,003,690, Cl. 425-466.000.

Magota, Hiromichi: *See—*
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Mahieux, Claude: *See—*
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Mahlein, Hans: *See—*
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Maillefer S.A.: *See—*
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Main, Harold M., to General Cable Corporation. Terminal housing. 4,003,610, Cl. 312-100.000.

Mainski, Albert: *See—*
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Makino, Shinichi; and Kokado, Naoyuki, to Tokyo Shibaura Electric Co., Ltd. Receiving program-presetting system for a television receiver. 4,004,085, Cl. 340-324.0AD.

Makovec, Francesco; Rovati, Luigi; and Senin, Paolo, to Rotta Research Laboratorium S.p.A. O-Tertiary amino-alkyl-N-benzoyl tyrosil amides. 4,004,008, Cl. 424-248.540.

Manganaro, James L.; and Carlson, Ronald H., to FMC Corporation. Process for recovery of cyanuric acid from treated chlorinator mother liquor. 4,003,899, Cl. 260-248.00A.

Mangum, Norman W., Jr.: *See—*
Lewis, George D.; Mangum, Norman W., Jr.; and Rusnak, James P., 4,003,201.

Mannara, Giuseppe, to Colgate-Palmolive Company. Production of particles for incorporation in dentifrices. 4,003,971, Cl. 264-9.000.

Mansfield, Tom: *See—*
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Marchesi, Carlo. Portable electric radiant heater. 4,004,128, Cl. 219-346.000.

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Mark Medical Supply, Inc.: *See—*
Zurolo, Gabriel J.; and Bull, Elmer G., 4,003,704.

Markham, Michael H.; and Varga, Joseph. Safe deposit apparatus, with selective plate and shield for dual function depository. 4,004,252, Cl. 232-44.000.

Marks, Lawrence Morton: *See—*
Goren, Robert Nathan; Streifer, William; and Marks, Lawrence Morton, 4,003,649.

Marley, Robert Russell; Nygaard, Paul Andrew; and Seelbach, Walter Christian, to Motorola, Inc. Bidirectional line driver. 4,004,091, Cl. 178-70.00R.

Marmonier, Pierre; Mesnage, Bernard; Teulon, Jean; and Simonneau, Jean-Pierre, to Commissariat a l'Energie Atomique. Device for supporting a fuel-pin cluster within a nuclear reactor fuel assembly wrapper. 4,003,787, Cl. 176-76.000.

Maroschak, Ernest J. Apparatus for molding plastic pipe with enlarged portions formed therein. 4,003,685, Cl. 425-135.000.

Marsh, David W., II. Electronic musical instrument. 4,003,284, Cl. 84-1.180.

Marsham, Peter Robert: *See—*
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Masaki, Hideyuki: *See—*
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Masiello, Grace M.: *See—*
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Massachusetts Institute of Technology: *See—*
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Masuoka, Seiichi, to A. I. C. Photo, Inc. Focusing screen for reflex cameras having integral range finder means. 4,003,637, Cl. 350-286.000.

Mathias, Christopher Neil, to Girling Limited. Sliding caliper disc brake. 4,003,453, Cl. 188-72.400.

Matichak, William. Casket lining means. 4,003,109, Cl. 27-19.000.

Matrosov, Vladimir Nikolaevich: *See—*
Koroljuk, Jury Fedorovich; Scherbakova, Lidia Petrovna; Vakulenko, Jury Andreevich; Matrosov, Vladimir Nikolaevich; Rud, Viktor Demyanovich; Chelyshev, Timofei Vasilievich; Shabashov, Vyacheslav Viktorovich; Shubnikov, Vladislav Vasilievich; and Schedrikov, Vadim Lvovich, 4,004,191.

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Matsumoto, Ryutaro: *See—*
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Matsumura, Jube, to Hitachi, Ltd. Method and apparatus for operating a steam turbine plant having feed water heaters. 4,003,205, Cl. 60-646.000.

Matsuo, Takashi: *See—*
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Matsushita, Hiromu; Yamahata, Takashi; and Kakimoto, Hiroshi, to General Company, Ltd. Coated heat sensitive recording member. 4,004,065, Cl. 428-532.000.

Mattel, Inc.: *See—*
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Maurer, Jeffrey A. Skate board wheel brake assembly. 4,003,582, Cl. 280-11.200.

Max-Planck-Gesellschaft zur Foderung der Wisenschaften e.V.: *See—*
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Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V.: *See—*
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Maxel, John M., to Armco Steel Corporation. Article transparent to microwaves and process for making same. 4,003,368, Cl. 126-390.000.

Mayne, William Harry, to Geosource Inc. Discrete frequency seismic exploration using non uniform frequency spectra. 4,004,267, Cl. 340-15.5TA.

McCaffrey, Patrick M.: *See—*
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McCombs, Frank P.: *See—*
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McCord, James W. Vapor generating and recovering apparatus. 4,003,798, Cl. 202-160.000.

McCoy, David R.; Cadorette, Raymond; and Eckert, George W., to Texaco Inc. Schiff bases as biocides in petroleum products. 4,003,719, Cl. 44-63.000.

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McFarland, Philip J.; and Rambauske, Werner R., to Raytheon Company. Catoptric lens arrangement. 4,003,639, Cl. 350-294.000.

McGrath, William L., to Carrier Corporation. Air conditioning system having improved dehumidification capabilities. 4,003,729, Cl. 62-93.000.

McInerney, Frank Thomas: *See—*
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McKay, Douglas William; Bolinger, Teddy L.; and Emerick, Norman L., to Bio-Dynamics, Inc. Apparatus for straightening the spinal column. 4,003,376, Cl. 128-69.000.

McLeod, Cedric W.; and Hughes, Samuel J. Moulding press. 4,003,686, Cl. 425-373.000.

McManigill, Douglass, to Hewlett-Packard Company. High pressure pump with metering. 4,003,679, Cl. 417-246.000.

McMillan, William J.: *See—*
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McNeil Corporation: *See—*
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Mecano-Bundy GmbH: *See—*
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Meier, Ernst; and Odermatt, Alois. Method of manufacture of a shoe. 4,003,146, Cl. 36-44.000.

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Mencacci, Samuel A.; Strasser, Jurgen H.; and Mansfield, Tom, to FMC Corporation. Retort system. 4,003,302, Cl. 99-359.000.

Menke, Kenneth W.; and Latta, Michael D., to Public Safety Equipment, Inc. Signal light assembly. 4,004,274, Cl. 340-84.000.

Menshikov, Jury Alexeevich: *See—*
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Messuri, Peter C. Edge molding. 4,003,180, Cl. 52-716.000.

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Metrier, Michel. Apparatus for loading ships or barges. 4,003,480, Cl. 214-14.000.

Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, to Bayer Aktiengesellschaft. 2-Amino-6-dialkylaminodihydropyridines, their production, pharmaceutical compositions and methods of use thereof. 4,004,014, Cl. 424-266.000.

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Middleton, William Robert, to British Cast Iron Research Assoc., The. Method of and means for obtaining white cast iron. 4,003,425, Cl. 164-58.000.

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Miller, Albert Arthur, to Wilson-Miller & Co. Ltd. Multi-ratio transmission systems. 4,003,273, Cl. 74-767.000.

Miller, Fredric S.; De Mauro, Armando A.; and Delvy, Robert James, to Universal Manufacturing Corporation. Automatic capacitor winding machine and method. 4,003,112, Cl. 29-25.420.

Miller, William A.: *See—*
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Miscavage, Raymond R., to McDonnell, John T., a part interest. Dart game scoreboard. 4,003,579, Cl. 273-148.00R.
Mishcon, Lester; and Agulnek, Harry, to Singer Company, The. Adjustable cushion cam for a knitting machine. 4,003,221, Cl. 66-57.000.
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Mitchell, Thomas O.; and Whitehurst, Darrell D., to Mobil Oil Corporation. Synthetic amorphous silicas of predetermined pore distribution, method of producing same and process of using same. 4,003,825, Cl. 208-120.000.
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Mooney, Ralph. Crane boom stop arrangement. 4,003,474, Cl. 212-59.00A.
Moore, Edward E., to Eclipse, Inc. High velocity burner. 4,003,692, Cl. 431-158.000.
Moore, Kerry Lamar. Fish growing tank and method. 4,003,337, Cl. 119-3.000.
Moosberg, Borje Sigurd, to ABU Aktiebolag. Coupling mechanism with means for disengagement and for automatic engagement of the spool in spinning reels. 4,003,270, Cl. 74-405.000.
Moreau, Michèle; Karadavidoff, Isaac; and Rissé, Claude, to Fuveau S.A. Derivatives of alpha-methyl benzylamine. 4,003,931, Cl. 260-570.50P.
Morgan, David Keith, to RCA Corporation. Keyed comparator. 4,004,158, Cl. 307-235.00T.
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Morooka, Yasuo; Onari, Mikihiko; and Kitanosono, Hidehiro, to Hitachi, Ltd. Method of and system for controlling temperature of continuous furnace. 4,004,138, Cl. 235-151.100.
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Mueller, Wolfgang H.; Oswald, Alexis A.; and Hall, Daniel N., to Exxon Research and Engineering Company. Addition of sulfenyl halides to olefins and acetylenes. 4,003,939, Cl. 260-453.0RZ.
Müller, Alexander; and Willenbring, Gerald R., to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V. Control of timing of laser operation. 4,004,248, Cl. 331-94.50P.
Muller, Hans. Process for growing chlorophyllose plants using carbon dioxide and heat generated in exothermic aerobic fermentation processes. 4,003,160, Cl. 47-58.000.
Muller, Hans; and Sotirianos, Konstantin, to Dr. Ing. Hans Muller. Apparatus for mixing a liquid phase with a gaseous phase. 4,003,796, Cl. 195-142.000.
Muller, Ludwig. Method of and device for anchoring a reinforcement beam to a sheet piling. 4,003,207, Cl. 61-39.000.
Muller, Paul Adolf; and Muster, Hans, to Celfil Company Establishment. Apparatus for treating webs of filtering material for tobacco

product filters, particularly cigarette filters. 4,003,684, Cl. 425-76.000.

Muller, Willy, to Ciba-Geigy AG. Tetracarboxylic acid ester substituted disazo pigments. 4,003,886, Cl. 260-176.000.

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Napier, Roger Paul; and Chapman, Orville L., to Mobil Oil Corporation. Selective phosphorylation process. 4,003,966, Cl. 260-971.000.

Narayanan, Venkatachala L.; and Haugwitz, Rudiger D., to E. R. Squibb & Sons, Inc. [(1,2,4-Oxadiazol-3-yl)phenyl]carbamic or thiocarbamic acid esters. 4,003,909, Cl. 260-307.00G.

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Nelson, William T., to Phillips Petroleum Company. Lead/chloride/alumina isomerization catalyst for gasoline. 4,003,849, Cl. 252-442.000.

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Norton, Morrison Kai, to Titan Trailer Corporation. Vacuum relief system for tarpaulin covered hopper trailers. 4,003,301, Cl. 98-13.000.
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Nowak, Milton; and Singer, William, to Troy Chemical Corporation. Enzyme inhibitors, uses and compositions containing same. 4,003,865, Cl. 260-17.00R.
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O'Brien, Patrick M.; Pittaro, Richard J.; and Walker, Philip A., to Krautkramer-Branson, Incorporated. Ultrasonic pulse-echo thickness measuring apparatus. 4,003,244, Cl. 73-67.80R.
Obser, Werner; and Pinior, Gernot, to Erwin Sick GmbH Optik-Elektronik. Apparatus for monitoring a moving web of material for faults. 4,004,152, Cl. 250-562.000.
Obser, Werner; and Pinior, Gernot, to Erwin Sick GmbH Optik-Elektronik. Apparatus for monitoring a web of material. 4,004,153, Cl. 250-572.000.
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O'Connor, Arthur Herman; and McCullough, Robert Eugene, to Time Computer, Inc. Solid state ladies' wristwatch. 4,003,196, Cl. 58-4.00A.
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Oesterling, Erwin, to Hauni-Werke Korber & Co., KG. Apparatus for manipulating filter rod sections or the like. 4,003,277, Cl. 83-102.000.
Oetiker, Hans. Mechanism for installing hose band clamps. 4,003,238, Cl. 72-410.000.
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O'Steen, James K., to United States of America, Navy. Fail safe centrifugal clutch. 4,003,458, Cl. 192-105.0BB.
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Ott, Henry Whitfield, to John Ott Laboratories, Inc. Apparatus for operating gaseous discharge lamps on direct current from a source of alternating current. 4,004,184, Cl. 315-101.000.
Ott, James H., to Novar Electronics Corporation. Enclosure system for sound generators. 4,004,094, Cl. 179-1.00E.
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Palyi, Leslie, to Palyi-Hansen International Aps. Apparatus for shelling and cleaning cereals. 4,003,303, Cl. 99-575.000.
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Parker, John Henry; and McInerney, Frank Thomas. Resiliently centered railway truck suspension. 4,003,317, Cl. 105-184.000.
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Patry, Francis Joseph, to Johns-Manville Corporation. Fastener and roof arrangement using the fastener. 4,003,175, Cl. 52-506.000.
Pattison, Victor A., to Hooker Chemicals & Plastics Corporation. Polymeric fluoromethylated dienes. 4,004,073, Cl. 526-252.000.
Paturle, Rene, to Etablissements Paturle S.A. Construction material and a process for producing the same. 4,003,866, Cl. 260-17.40R.
Paull, Peter L.; and Armistead, Fontaine C., to Texaco Development Corporation. Method of recovery of bitumen from tar sand formations. 4,003,432, Cl. 166-271.000.
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Pearce, Godfrey Roy; Beard, Kenneth Drew; and Shively, Donald Lloyd, to P. R. Mallory & Co. Inc. Electrical component seal. 4,004,199, Cl. 317-230.000.
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Peterson, Marvin A., to General Electric Company. Aqueous polyester coating composition. 4,004,062, Cl. 428-383.000.

Peterson, Marvin A.; and Cline, Oliver I., to General Electric Company. Aqueous enamel for coating magnet wire. 4,004,063, Cl. 428-383.000.

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Picandet, Jean; and Boullier, Francois, to Jeumont-Schneider. System for feeding in continuous current to a telephone line. 4,004,104, Cl. 179-70.000.

Pickering, Donald E. Transport and life-support system for infants. 4,003,378, Cl. 128-204.000.

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Potvin, Alfred Marcel, to Les Placement Courteau Limitee. Electric heating and humidifying apparatus. 4,003,967, Cl. 261-30.000.

Poulos, Andrew L.: *See—*
Elsasser, Harold B.; Gunion, James F.; Huerter, Melvin L.; and Poulos, Andrew L., 4,003,558.

Powell, Justin C.: *See—*
Schlicht, Raymond C.; and Powell, Justin C., 4,003,720.

Powell, Orlo A., Jr.; and Roncari, Angelo J., to Urban Research & Development Corporation. Apparatus for pyrolytic treatment of solid waste materials to form ceramic prills. 4,003,683, Cl. 425-6.000.

PPG Industries, Inc.: *See—*
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Prasada, Birendra: *See—*
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Precision Metalsmiths, Inc.: *See—*
Shikinai, Tadaomi J.; and Horton, Robert A., 4,003,423.

Precision Thin Film Corporation: *See—*
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Prevorsek, Metka: *See—*
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Price, James B., to Motorola, Inc. Method of fabricating thin monocrystalline semiconductive layer on an insulating substrate. 4,004,046, Cl. 427-85.000.

Price, John A.: *See—*
Skaar, Thomas F.; and Price, John A., 4,003,878.

Price, Ralph E.; and Harris, James C., to Landis Tool Company. Cylindrical grinder. 4,003,721, Cl. 51-105.0SP.

Pries, Erich E., to Dr. C. Otto & Comp. G.m.b.H. Coke guide machine for a battery of coke ovens. 4,003,802, Cl. 202-241.000.

Princen, Lambertus H.: *See—*
Baker, Frederick L.; and Princen, Lambertus H., 4,003,135.

Proctor, Sidney Ernest, to Austin Hoy and Company Limited. Bottom unloader for a storage container. 4,003,481, Cl. 214-17.0DA.

Prokai, Bela, to Union Carbide Corporation. Solvent solutions of siloxane fluids. 4,003,847, Cl. 252-350.000.

Proptic, S.A.: *See—*
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Pross, Wilhelm: *See—*
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Public Safety Equipment, Inc.: *See—*
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Puchalski, Walter J., to United States of America, Army. Projectile. 4,003,313, Cl. 102-66.000.

Puchta, Rolf: *See—*
Hachmann, Klaus; Puchta, Rolf; and Sperling, Gerhard, 4,003,841.

Puddington, I. E.: *See—*
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Pulciani, Sam C.: *See—*
Ostrem, Obert M.; Kulikowski, Donald F.; and Pulciani, Sam C., 4,003,496.

Pulse Dynamics Corporation: *See—*
Kerber, Marvin Clarence; and Traver, William Steven, 4,004,220.

Punwani, Dharamvir: *See—*
Weil, Sanford A.; Tarman, Paul B.; and Punwani, Dharamvir, 4,003,821.

Puta, Ruben W. Whipped honey spread. 4,004,040, Cl. 426-564.000.

QIV Incorporated: *See—*
Torok, Harold Franklin, 4,003,451.

Quality Roofing Company, Incorporated: *See—*
Morris, Paul L., 4,003,553.

Quehen, Andre, to SECIM. Process of hot continuous rolling. 4,003,236, Cl. 72-366.000.

Quigley, Joseph R.: *See—*
Cass, Boyd E.; Coate, David W.; and Quigley, Joseph R., 4,003,717.

Qureshi, Shahid U. H.; and Forney, George D., Jr., to Codex Corporation. QAM receiver having automatic adaptive equalizer. 4,004,226, Cl. 325-42.000.

R. N. L. I. (Trading) Limited: *See—*
Brinton, Michael Brian Jervis, 4,003,331.

Rabito, Thomas G.; Kieft, Alvin J.; and Cline, Richard L., to Goodyear Tire & Rubber Company, The. Two-part primer system for FRP bonding. 4,004,050, Cl. 427-302.000.

Radici, Pierino; Bianchi, Gaudenzio; Colombo, Daniele; and Colombo, Paolo, to Societa'Italiana Resine S.I.R. S.p.A. Block copolymers. 4,003,960, Cl. 260-857.00F.

Radscheit, Kurt: *See—*
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Raduchel, Bernd: *See—*
Skuballa, Werner; Raduchel, Bernd; Vorbruggen, Helmut; Elger, Walter; Losert, Wolfgang; and Loge, Olaf, 4,004,020.

Rai, Yasuki; Sasami, Terutoshi; Hasegawa, Yuzuru; and Okazoe, Masaru, to Sanyo Electric Co., Ltd. Electrically reprogrammable nonvolatile floating gate semi-conductor memory device and method of operation. 4,004,159, Cl. 307-238.000.

Rakhit, Sumanas, to American Home Products Corporation. Glycosyl esters of phenoxyisobutyric acids. 4,003,995, Cl. 424-180.000.

Ramazzotti, Dario J.; and Thiry, Geza A., to McNeil Corporation. Fluid impingement mixing apparatus. 4,003,501, Cl. 222-135.000.

Rambauske, Werner R.: *See—*
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Ramuz, Henri, to Hoffmann-La Roche Inc. Sulphur containing derivatives. 4,003,914, Cl. 260-327.00M.

Ranz, Erwin: *See—*
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Raskin, Jef, to Jef's Friends. Model aircraft and package. 4,003,155, Cl. 46-79.000.

Rath, Eric. Method and apparatus for controlling the storage condition of perishable commodities in long-distance transport vehicles. 4,003,728, Cl. 62-78.000.

Rau, Peter; and Hunt, Kevin, to Siemens Aktiengesellschaft. Reactor core melt containment receptacle. 4,003,785, Cl. 176-38.000.

Raymond Lee Organization, Inc., The: *See—*
Bayder, George J., 4,003,147.
Jensen, George W., 4,003,118.
Smolen, William G., 4,003,654.
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Schloemann, Ernst F. R. A., 4,003,830.

RCA Corporation: *See—*
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Etter, Robert William, 4,003,806.
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Rebsamen, Albert; and Scherrer, Franz Xaver, to Heberlein & Co. AG. Process and apparatus for extending the life of the belt of a delivery device for textile filaments. 4,003,510, Cl. 226-1.000.

Reckard, Ronald M., to General Electric Company. Voltage surge arrester with capacitive grading and improved sparkover for fast impulses. 4,004,193, Cl. 317-70.000.

Reed Tool Company: *See—*
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Reeves Brothers Inc.: *See—*
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Regie Nationale des Usines Renault: *See—*
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Reichl, Richard: *See—*
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Reifsteck, Robert L.: *See—*
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Reinhall, Rolf Bertil. Screw press. 4,003,304, Cl. 100-117.000.

Reinke, Robert V.; Newton, John E.; and Reifsteck, Robert L., to Eastman Kodak Company. Distortion correction apparatus for electro-optical reflectors which scan beams to produce images. 4,003,626, Cl. 350-6.000.

Reinke, Theodore S.: *See—*
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Revy von Belvard, Peter: *See—*
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Reyer, William J. Hoist and transporting apparatus. 4,003,479, Cl. 214-1.00D.

Reymore, Harold E., Jr.; and Zane, John K., to Upjohn Company, The. Novel process for trimerizing polyisocyanates. 4,003,859, Cl. 260-2.5AC.

Reynolds, Charles Edward, to AMP Incorporated. Wire securing member with varying serrations. 4,003,623, Cl. 339-97.00C.

Reynolds, Thomas J.; and Blanchet, James P., to Western Gear Corporation. Crane hook heave compensator and method of transferring loads. 4,003,472, Cl. 212-3.000.

Rhodes, Randy Deleon: *See—*
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Rhone-Poulenc Industries: *See—*
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Richard, Harold S.; Grillmeier, Eugene L.; Gross, Jack R.; and Myers, Robert P., to NCR Corporation. Programmable cryptic device for enciphering and deciphering data. 4,004,089, Cl. 178-22.000.

Richards, Gordon B. Logging truck tripping mechanism. 4,003,585, Cl. 280-145.000.

Richardson, Kenneth, to Pfizer Inc. Antiviral substituted phenylenedimethylene diamines. 4,003,929, Cl. 260-556.00A.

Richmond, Michael Hugh; and Wright, Henry Glyn, to Polysar Limited. Packaging films. 4,004,075, Cl. 526-342.000.

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Ricoh Co., Ltd.: *See—*
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Rigden, Sydney Alfred Richard. Niobium alumina sealing and product produced thereby. 4,004,173, Cl. 313-317.000.

Ring, Maurice Frank: *See—*
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Riseberg, Leslie A.; Lempicki, Alexander; Brecher, Charles; and Dressel, Herman O., to GTE Laboratories Incorporated. White light source. 4,004,178, Cl. 313-468.000.

Risse, Claude: *See—*
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Rizzuto, Anthony Benny; Skole, Richard David; Newman, Henry Harry; Hogu, Jacqueline Noailles-Benito; and Toscano, Vincent Anthony, to Amstar Corporation. Material useful for and method of employing the same for the growing of microorganisms. 4,003,791, Cl. 195-36.00P.

Ro-Search, Inc.: *See—*
Liebscher, Anton; Oberg, Sven; Smathers, Kenneth; and Auberry, Horace, 4,003,145.

Roach, John Robert, to University of Adelaide. Absorption refrigeration system. 4,003,215, Cl. 62-476.000.

Robert Bosch G.m.b.H.: *See—*
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Streit, Klaus; Staiger, Karl; Conzelmann, Gerhard; Seiler, Hartmut; and Nagel, Karl, 4,004,160.
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Robertshaw Controls Company: *See—*
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Cairo, Anthony C.; and Holkeboer, Ronald E., 4,004,198.

Robertson, Robert H., to Ronbil Industries, Inc. Camper kit. 4,003,596, Cl. 296-23.00R.

Robinson, Denis Wilson; and Madison, George Benjamin, to Coleman Company, Inc., The. Method of erecting a tent structure. 4,003,181, Cl. 52-745.000.

Robinson, Horace John, to FMC Corporation. Combination positioning and propelling apparatus for barges. 4,003,329, Cl. 114-242.000.

Robinson, Martin Alvin: *See—*
Jones, Edward Stephen; Robinson, Martin Alvin; and Eibeck, Richard Elmer, 4,003,984.

Robinson, Stephen Perrin; Evans, David Charles; and Hewitt, Martin, to Ansafone Limited. Telephone answering machines. 4,004,276, Cl. 340-171.00A.

Robinson, William C. Carburetor system for internal combustion engine. 4,003,969, Cl. 261-145.000.

Rockwell International Corporation: *See—*
Gompert, Leon T., 4,004,206.
Haehnel, Rudolf Herbert; and Graeff, Barry Lee, 4,003,290.
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Spence, John R., 4,004,163.
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Volpe, Richard L., 4,003,412.

Roeder, Georg, to Messer Griesheim GmbH. Flame-cutting machine. 4,003,556, Cl. 266-48.000.

Rogers, Melvin F., to Zenith Radio Corporation. Color television picture tubes with improved implosion protection system. 4,004,092, Cl. 358-246.000.

Rogojew, Nikolaj Wladimir. Longitudinal-stroke internal combustion engines. 4,003,352, Cl. 123-58.00B.

Rokudo, Nerumitu: *See—*
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Rolla, Aldo. Flat self-supporting vault for tunnel type furnaces particularly for baking bricks and tiles. 4,003,696, Cl. 432-238.000.

Rollenitz, Leopold: *See—*
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Rolles, Rolf; Williams, James E., Jr.; and Kondis, Thomas J., to Aluminum Company of America. Metal-pigmented plastic powder and process. 4,003,872, Cl. 260-37.0EP.

Rollins, Dallas W.: *See—*
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Rookus, James E. Hair raising panel for electric shavers. 4,003,130, Cl. 30-34.200.
Rorvig, Knud, to Biofac A/S. Piglet enteritis treatment. 4,003,993, Cl. 424-104.000.
Rose, David; Saygin, Ferdi; and Weinrich, Erwin, to Henkel & Cie G.m.b.H. Oxidation hair dyes based upon tetraaminopyrimidine developers. 4,003,699, Cl. 8-10.200.
Rose, John Brewster: *See—*
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Rossi, Alberto: *See—*
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Rowe International Inc.: *See—*
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Royal Continental Box Company: *See—*
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Ryan, William J., to Ryan Ramp, Inc. Combined marine ramp transfer and mooring system. 4,003,473, Cl. 214-14.000.
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Schellenbaum, Max, to Ciba-Geigy Corporation. Certain alkylphenols used to control bacteria. 4,004,033, Cl. 424-347.000.

Scherbakova, Lidia Petrovna: *See—*
Koroljuk, Jury Fedorovich; Scherbakova, Lidia Petrovna; Vakulenko, Jury Andreevich; Matrosov, Vladimir Nikolaevich; Rud, Viktor Demyanovich; Chelyshev, Timofei Vasilievich; Shabashov. Vyacheslav Viktorovich; Shubnikov, Vladislav Vasilievich; and Schedrikov, Vadim Lvovich, 4,004,191.

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Schlicht, Raymond C.; and Powell, Justin C., to Texaco Inc. Telomerichydrocarbon phosphorus compound and hydrocarbon composition containing same. 4,003,720, Cl. 44-76.000.

Schloemann, Ernst F. R. A., to Raytheon Company. Non-ferromagnetic materials separator. 4,003,830, Cl. 209-3.000.

Schmidt-Balve, Helmut, to Dr. C. Otto & Comp. G.m.b.H. Control system for preventing an excessive temperature rise in a battery of coke ovens. 4,003,803, Cl. 202-262.000.

Schmidt, Gerhard R. Door construction. 4,003,163, Cl. 49-503.000.

Schmitt, Robert L., to Molins Machine Company, Inc. Slitter and dust collector therefor. 4,003,276, Cl. 83-100.000.

Schmitt, William H., to Alberto Culver Company. Effervescent molded triturate tablets. 4,004,036, Cl. 426-285.000.

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Schornig, Eberhard, to Hoechst Aktiengesellschaft. Metering device. 4,003,500, Cl. 222-133.000.

Schott, Charles M., Jr., to Gloucester Engineering Co. Inc. Apparatus for driving moving webs in bag making machines. 4,003,298, Cl. 93-33.00H.

Schramm, Buford J.; and Everts, Robert G. Process for making a composite cylinder head assembly. 4,003,422, Cl. 164-9.000.

Schreves, Dave W. Macrame assembly holder. 4,003,592, Cl. 289-18.000.

Schroder, Gerd, to U.S. Philips Corporation. Readout apparatus for frequency or period-analog measuring signals. 4,004,137, Cl. 235-92.0TF.

Schroll, Franz-Heinz: *See—*
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Schromm, Kurt; Renth, Ernst-Otto; Mentrup, Anton; and Reichl, Richard, to Boehringer Ingelheim GmbH. Pharmaceutical compositions containing a 1-(3-trifluoromethyl-4'-chloro-phenyl)-2-(carboxylic acylakyl-amino) propane and method of use. 4,004,032, Cl. 424-330.000.

Schuessler, Charles J.: *See—*
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Schuldink, Gerrit, to Industriele Onderneming Wavin N.V. Plastic socket made of fibre reinforced thermosetting resin material. 4,003,591, Cl. 285-110.000.

Schuller, Ronald M. Single bus DC control circuit. 4,004,156, Cl. 307-113.000.

Schulte, William Lester, Jr.: *See—*
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Schultz, Everett M.: *See—*
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Schumacher, Charles G.; and Dravec, Robert E., to Panduit Corporation. Ladder strap cable tie with pivotal dog. 4,003,106, Cl. 24-16.0PB.

Schumacher, Frank A., to General Electric Company. Automatic ice maker utilizing heat pipe. 4,003,214, Cl. 62-340.000.

Schutt, Keith M. Fireplace assembly with variable appearance. 4,003,361, Cl. 126-120.000.

Schwammle, Rudolf: *See—*
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Schwan, Thomas J., to Morton-Norwich Products, Inc. 1-Benzyl-5-chloro-2-(1H)-pyrimidone. 4,003,900, Cl. 260-251.00R.

Schwartz, Louis A. Music signal conversion apparatus. 4,003,285, Cl. 84-1.240.

Schwartz, Martin Alan, to Florida Board of Regents. N-acyl-N-norsalutaridines and process for making them. 4,003,903, Cl. 260-285.000.

Schwarzmann, Günter; and Holtschmidt, Ulrich, to Th. Goldschmidt AG. Microbiocidally effective amines or amine mixtures. 4,004,030, Cl. 424-325.000.

Schwestka, Crayton H., to National Steel Corporation. Method and apparatus for aligning strip end portions in a continuous strip operation. 4,003,511, Cl. 226-3.000.

Scientific Mining & Manufacturing Company: *See—*
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Scott, John William; Parrish, David Richard; and Saucy, Gabriel, to Hoffmann-La Roche Inc. Antioxidant chroman compounds. 4,003,919, Cl. 260-345.500.

Scott Paper Company: *See—*
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Sea Savory, Inc.: *See—*
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Seiler, Hartmut: *See—*
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Sekikawa, Nobuyoshi: *See—*
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Selin, Terry G., to General Electric Company. Siloxanediolate complexes and preparation thereof. 4,003,917, Cl. 260-340.600.

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Settepani, Joseph A., to Ortho Pharmaceutical Corporation. Method of inducing infertility in male animals and inhibiting the growth of the prostate. 4,004,017, Cl. 424-274.000.

Sexton, Arthur R.: *See—*
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Shabashov. Vyacheslav Viktorovich: *See—*
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Shapiro, Justin Joel; Shapiro, Marion Henrietta; and Chin, John W. G., to Shapiro, Justin Joel. Precision liquid dispensing device. 4,003,499, Cl. 222-50.000.

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Sharp, Thomas L. Oil-soluble composition for removing iron sulfide and sludge from metal surfaces. 4,003,856, Cl. 252-546.000.

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Shell Oil Company: *See—*
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Shian, Vitaly Mikhailovich: *See—*
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Shieh, Kenneth K., to Anheuser-Busch, Incorporated. Media containing molasses and soy flour for producing glucose isomerase and method. 4,003,793, Cl. 195-66.00R.

Shields, John Tipton, to Jackes-Evans Manufacturing Company. Tube cutting apparatus. 4,003,278, Cl. 83-186.000.

Shikinai, Tadaomi J.; and Horton, Robert A., to Precision Metalsmiths, Inc. Methods and means for making dental castings and the like. 4,003,423, Cl. 164-34.000.

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Shimasaki, Nobuhiko, to Communications Satellite Corporation (Comsat). Satellite on-board switching system with satellite-to-satellite link. 4,004,098, Cl. 179-15.0BS.

Shimizu, Hiroshi: *See—*
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Shimizu, Shinkichi: *See—*
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Shimizu, Terushige, to Nippon Kogaku K.K. Film winding device for photographic cameras. 4,003,268, Cl. 74-126.000.

Shimoshimizu, Morio: *See—*
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Shindo, Tadashi: *See—*
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Shiraishi, Tatsuo; Shimizu, Shinkichi; Ichihashi, Hiroshi; Shindo, Tadashi; and Kato, Fumiyoshi, to Sumitomo Chemical Company, Limited. Method for treating ammonia-containing gases. 4,003,978, Cl. 423-237.000.

Shiu, Thomas B. Method and apparatus for packaging sliced bacon and the like. 4,003,184, Cl. 53-32.000.

Shively, Donald Lloyd: *See—*
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Shoaf, Myron D.; and Pischke, LaMonte D., to General Foods Corporation. Sweetening composition and process therefor. 4,004,039, Cl. 426-548.000.

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Shulman, Albert; and Shulman, Glenda Maud. Contraceptive and antivenereal agents. 4,004,006, Cl. 424-245.000.

Shulman, Glenda Maud: *See—*
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Shumway, Richard A. Roof tile system. 4,003,176, Cl. 52-539.000.

Sibi, Monique; and Demarly, Yves, to Agence Nationale de Valorisation de la Recherche (ANVAR). Process for obtaining variants of plants with improved characteristics. 4,003,156, Cl. 47-58.000.

Sidebotham, Norman C.; Shoemaker, Paul D.; and Young, Clarence W., III, to Monsanto Company. Fabric dye stripping, separation and recovery of polyester. 4,003,880, Cl. 260-75.00T.

Sidebotham, Norman C.; Shoemaker, Paul D.; and Young, Clarence W., III, to Monsanto Company. Polyester polymer recovery from dyed polyester fabrics. 4,003,881, Cl. 260-75.00T.

Sieberer, Karl-Heinz, to Firm C. Conradty. Method and apparatus for regulating and controlling the anode current and for avoiding short-circuits between the electrodes of an electrolysis cell. 4,003,808, Cl. 204-99.000.

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Skole, Richard David: *See—*
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Skvortsov, Gennady Alexeevich; Nizeeva, Nellya Nikitichna; Podzharsky, Avrum Iosifovich; and Dobrovolskaya, Irma Viktorovna. Catalyst of supported vanadium oxide and manganese oxide and method of producing same. 4,003,854, Cl. 252-471.000.

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Smith, Harry A., to Dow Chemical Company, The. Cement-phenolic resin compositions. 4,003,873, Cl. 260-38.000.

Smith, Judson L. Turntable car washing method using power rubbing devices. 4,003,391, Cl. 134-6.000.

Smith, Oliver Wendell; Carder, Charles Hobert; and Trecker, David John, to Union Carbide Corporation. Ink or coating compositions of low volatility. 4,003,868, Cl. 260-21.000.

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Smith, Walter A. Bus connectors. 4,003,619, Cl. 339-22.00B.

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Societe Anonyme dite: Potain Poclain Materiel: *See—*
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Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., to Xerox Corporation. Fluid conveyer. 4,003,568, Cl. 271-225.000.
Stange, Ronald R., to Tools for Bending, Inc. Bending and straightening mechanism for mine roof bolts. 4,003,233, Cl. 72-133.000.
Stanzel, Ned L. Trailer having a vertically adjustable bed. 4,003,583, Cl. 280-43.220.
Stapp, Paul R., to Phillips Petroleum Company. Preparation of quinones. 4,003,923, Cl. 260-369.000.
Starinsky, Anatoly Antonovich: *See*—
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Stearns, Charles F.; and Hansen, Kenneth P., to United Technologies Corporation. Device for filtering a moving fluid. 4,003,836, Cl. 210-247.000.
Stedman Corporation: *See*—
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Steele, Artie, to Union Camp Corporation. Handle container. 4,003,515, Cl. 229-52.00B.
Steffens, Gunter, to Cramer-Halstrup & Schrunder. Arrangement for oil spray pumps. 4,003,409, Cl. 139-1.00R.
Steigelman, James Q.; Cleveland, Joseph J.; Kleiner, Richard N.; and Rymas, Frank, to GTE Sylvania Incorporated. Cast cemented refractory metal carbides having improved sintered density. 4,003,716, Cl. 29-182.700.
Stein, John William. Rotary piston engine having continuous torque characteristics. 4,003,682, Cl. 418-107.000.
Steinberg, Izchak Zevi, to Yeda Research & Development Co., Ltd. Device for calibrating instrument that measures circular dichroism or circularly polarized luminescence. 4,003,663, Cl. 356-243.000.
Stelma, Gerard N., to Keeler Brass Company. Mirror assembly. 4,003,271, Cl. 74-501.00M.
Stelter, Manfred K. Method for fluid film application. 4,004,045, Cl. 427-55.000.
Stemler, Orrin A.; and Cobb, Delwin E., to Caterpillar Tractor Co. Impact means for ripper. 4,003,603, Cl. 299-37.000.
Step, Frank. Structure for accommodating realignment of deformed vehicles. 4,003,239, Cl. 72-457.000.
Sterling Drug Inc.: *See*—
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Sternheimer, Michael, to Astra-Werke GmbH Druck & Verpackung. Packing system. 4,003,299, Cl. 93-49.00M.
Stevels, Albert Leendert Nicolaas: *See*—
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Stevens, Violete L.; Sexton, Arthur R.; and Corson, Frederick P., to Dow Chemical Company, The. Linear copolymers of glycidol. 4,003,961, Cl. 260-874.000.
Stevens, Wallace Gene; and Karstensen, Karl Wilfred, to Caterpillar Tractor Co. Actuating mechanism for gas turbine engine nozzles. 4,003,675, Cl. 415-150.000.
Stewart, John A.: *See*—
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Stoy, William S.; and Roth, Shirley H., to Cities Service Company. Novel intumescent composition. 4,003,863, Cl. 260-2.5FP.
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Strade, Henry A., to Akzona Incorporated. Steroidal erythropoietic agents and therapeutic compositions and methods. 4,004,005, Cl. 424-243.000.
Stradella, Giuseppe; and Stradella, Umberto. High-pressure valve with balanced internal components. 4,003,548, Cl. 251-45.000.
Stradella, Umberto: *See*—
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Streit, Klaus; Staiger, Karl; Conzelmann, Gerhard; Seiler, Hartmut; and Nagel, Karl, to Robert Bosch G.m.b.H. Switching system to short-circuit a load with minimum residual voltage. 4,004,160, Cl. 307-253.000.
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Wells, Robert A.; and Strobe, Carl J., 4,003,493.
Strong, Jerry Glenn; and Kaufman, Harold Alexander, to Mobil Oil Corporation. 1-(4-Butylphenyl)-1-(3,4-methylenedioxyphenyl)-2-nitroalkanes and synergistic insecticidal mixtures therewith. 4,004,023, Cl. 424-282.000.
Stuebinger, Walter, to BHS-Bayerische Berg Hutten-und Salzwerke Aktiengesellschaft. Drive device for web crosscutting apparatus. 4,003,280, Cl. 83-324.000.
Stuetz, Dagobert Engelbert: *See*—
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Stull, James T., to United States Steel Corporation. Hydraulically operated retractable spindle. 4,003,219, Cl. 64-23.000.
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Suga, Shigeru. Coated carbon electrode having an inner coating of low resistance material. 4,003,615, Cl. 314-60.000.
Sugiura, Mamoru; Shimizu, Hiroshi; Sugiyama, Masayasu; Kuratsu, Takeo; and Hirata, Fumio, to Ono Pharmaceutical Co., Ltd. Process for producing cholesterol oxidase. 4,003,794, Cl. 195-66.00R.

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Taylor, George E., to Nachman Corporation. Means mounting torsion springs. 4,003,564, Cl. 267-108.000.
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B 54,859	4,000,101	Feb. 17, 1976	Dec. 28, 1976
B 59,512	3,999,216	Mar. 16, 1976	Dec. 21, 1976
B 73,017	4,001,879	Mar. 9, 1976	Jan. 4, 1977
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976
B 97,259	3,999,614	Mar. 9, 1976	Dec. 28, 1976
B 111,130	4,001,380	Mar. 16, 1976	Jan. 4, 1977
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976
B 167,470	4,001,101	Mar. 2, 1976	Jan. 4, 1977
B 181,208	4,001,391	Mar. 9, 1976	Jan. 4, 1977
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976
B 223,678	3,989,159	Mar. 9, 1976	Nov. 2, 1976
B 231,416	4,000,054	Mar. 30, 1976	Dec. 28, 1976
B 236,342	4,001,182	Feb. 10, 1976	Jan. 4, 1977
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976
B 257,143	4,000,111	Mar. 16, 1976	Dec. 28, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976
B 271,743	4,001,195	Mar. 16, 1976	Jan. 4, 1977
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976
B 279,415	4,000,697	Mar. 16, 1976	Jan. 4, 1977
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976
B 288,757	4,001,072	Mar. 30, 1976	Jan. 4, 1977
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976
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B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976
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B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976
B 313,280	4,003,591	Apr. 6, 1976	Jan. 18, 1977
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976
B 328,116	4,000,774	Mar. 9, 1976	Jan. 4, 1977
B 330,719	4,001,121	Mar. 16, 1976	Jan. 4, 1977
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B 332,442	4,001,231	Mar. 30, 1976	Jan. 4, 1977
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976
B 333,247	4,001,201	Mar. 16, 1976	Jan. 4, 1977
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976
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B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976
B 339,446	4,001,067	Feb. 24, 1976	Jan. 4, 1977
B 340,170	4,000,444	Mar. 30, 1976	Dec. 28, 1976
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976
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B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976
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B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976
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B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
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B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
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B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
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B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 403,766	3,994,854	Feb. 10, 1976	Nov. 30, 1976
B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976
B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976
B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976
B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977

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DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 480,292	3,994,011	Mar. 16, 1976	Nov 23, 1976
B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976
B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976
B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976
B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977
B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977
B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977
B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976
B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977
B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976	B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976	B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976	B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976	B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976	B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976	B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976	B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976	B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977	B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976	B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976	B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976	B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976	B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977	B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976	B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976	B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976	B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976	B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976	B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976	B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976	B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976	B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976	B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977	B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976	B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976	B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976	B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976	B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976	B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976	B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976	B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976	B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976	B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976	B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976	B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976	B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976	B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976	B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976	B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976	B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976	B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976	B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976	B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977	B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976	B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976	B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976	B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976	B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976	B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976	B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976	B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977	B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976	B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976	B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976	B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976	B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976	B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976	B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976	B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977	B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976	B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976	B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977	B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976	B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976	B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976	B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976	B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976	B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976	B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976	B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976	B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976	B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977	B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976	B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976	B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976	B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976	B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976	B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976	B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976
B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977	B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976	B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976	B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976	B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976	B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976	B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976	B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976	B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 197
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976
B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977
B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977
B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976
B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976
B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977
B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 18TH DAY OF JANUARY, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Bickel, Hans; Muller, Johannes; Bosshardt, Rolf, deceased (by Bosshardt-Schar, Ruth Elisabeth, legal representative); Peter, Heinrich; and Fechtig, Bruno, to Ciba-Geigy Corporation. 7-Pyridinium methyl carboxyl derivatives of 7-amino-cephalosporanic acid. Re. 29,119, Cl. 260-243.00C.

Bosshardt, Rolf, deceased: *See*—
Bickel, Hans; Muller, Johannes; Bosshardt, Rolf, deceased; Peter, Heinrich; and Fechtig, Bruno, Re. 29,119.

Bosshardt-Schar, Ruth Elisabeth, legal representative: *See*—
Bickel, Hans; Muller, Johannes; Bosshardt, Rolf, deceased; Peter, Heinrich; and Fechtig, Bruno, Re. 29,119.

Campbell, Walden Sam: *See*—
Guy, Billy Lynn; and Campbell, Walden Sam, Re. 29,116.

Ciba-Geigy Corporation: *See*—
Bickel, Hans; Muller, Johannes; Bosshardt, Rolf, deceased; Peter, Heinrich; and Fechtig, Bruno, Re. 29,119.

Fechtig, Bruno: *See*—
Bickel, Hans; Muller, Johannes; Bosshardt, Rolf, deceased; Peter, Heinrich; and Fechtig, Bruno, Re. 29,119.

Guy, Billy Lynn; and Campbell, Walden Sam, to Kalinco, Inc. Pressure gauge. Re. 29,116, Cl. 137-227.000.

Kalinco, Inc.: *See*—
Guy, Billy Lynn; and Campbell, Walden Sam, Re. 29,116.

Maurer, Gottfried: *See*—
Sahatjian, Edward; and Maurer, Gottfried, Re. 29,117.

McQuestion, James H. Burial vault. Re. 29,114, Cl. 27-35.000.

Muller, Johannes: *See*—
Bickel, Hans; Muller, Johannes; Bosshardt, Rolf, deceased; Peter, Heinrich; and Fechtig, Bruno, Re. 29,119.

Peter, Heinrich: *See*—
Bickel, Hans; Muller, Johannes; Bosshardt, Rolf, deceased; Peter, Heinrich; and Fechtig, Bruno, Re. 29,119.

Rouverol, William S. Contact gearing. Re. 29,115, Cl. 74-462.000.

Sahatjian, Edward; and Maurer, Gottfried. Automatic spray dispenser with integrated test apparatus. Re. 29,117, Cl. 222-70.000.

Stamberger, Paul. Method of preparing polyurethanes from liquid, stable, reactive, film-forming polymer/polymer mixtures formed by polymerizing an ethylenically unsaturated monomer in a polyol. Re. 29,118, Cl. 260-2.5BE.

LIST OF PLANT PATENTEES

Biggers, Donald L. Plant of the fern family. 4,010, 1-18-77, Cl. 88.000.

LIST OF DESIGN PATENTEES

Adkinson, Joseph E. Bookcase or the like. 243,053, 1-18-77, Cl. D6-161.000.

American Home Products Corporation (Del.): *See*—
Dash, Barry H., 243,122.

American Hospital Supply Corporation: *See*—
Ziegler, John S.; Mosior, Donald J.; and Carroll, Ronald L., 243,115.

American Optical Corporation: *See*—
Johnsen, David W., 243,084.
Shindler, Anthony, 243,083.

American Standard Inc.: *See*—
Sheth, Santosh D., 243,092.
Stichtenoth, Warren G., 243,095.

American Telecommunications Corporation: *See*—
Perkins, George D., 243,096.

Andersson, Karl Gosta Bertil, to Duni Bila AB. Plate. 243,056, 1-18-77, Cl. D7-1.000.

Atari, Inc.: *See*—
Cheng, Regan L., 243,106.

Atlas-Graham Industries Company Ltd.: *See*—
Graham, Joseph A.; Stephenson, Reginald M.; and Dewar, Donald D., 243,060.

Barthropp, Francis M. L., to Barton of Canada Ltd. Toy water gun. 243,111, 1-18-77, Cl. D34-15.0VV.

Barton of Canada Ltd.: *See*—
Barthropp, Francis M. L., 243,111.

Baxter Travenol Laboratories, Inc.: *See*—
Ralston, Philip G., Jr.; Miller, Joe A.; and Cammarata, Frank, III, 243,121.

Beeman, Everett C.; and Speak, Richard C., to United States Borax & Chemical Corporation. Bottle. 243,064, 1-18-77, Cl. D9-137.000.

Blumberg, Annette. Jewelry hanger. 243,055, 1-18-77, Cl. D6-247.000.

Breger, Carl-Arne, to Telefonaktiebolaget L M Ericsson. Telephone accessory. 243,091, 1-18-77, Cl. D26-14.00A.

Burgheimer, Alan J.; and Franks, George J. Combined closure and support for a container. 243,070, 1-18-77, Cl. D9-261.000.

Cammarata, Frank, III: *See*—
Ralston, Philip G., Jr.; Miller, Joe A.; and Cammarata, Frank, III, 243,121.

Carroll, Ronald L.: *See*—
Ziegler, John S.; Mosior, Donald J.; and Carroll, Ronald L., 243,115.

Cheng, Regan L., to Atari, Inc. Game cabinet. 243,106, 1-18-77, Cl. D34-5.00J.

Coupe, James M. Set of fireplace tools and stand therefor. 243,061, 1-18-77, Cl. D7-206.000.

Cowan, Murray L., to Textron Inc. Expansible link chain for a bracelet or similar article. 243,114, 1-18-77, Cl. D11-23.000.

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4,003,394
68 A 4,003,395
83 4,003,396
227 Re.29,116
493.9 4,003,397
512 4,003,398
592 4,003,399
596 4,003,400
599.2 4,003,401
624.18 4,003,402
625.41 4,003,403
627.5 4,003,404

CLASS 138

40 4,003,405
103 4,003,407
118 4,003,408

CLASS 139

1 R 4,003,409
80 4,003,406
207 4,003,410
308 4,003,411
449 4,003,412

CLASS 140

1 4,003,413
4,003,414

CLASS 141

59 4,003,415

392 4,003,416

CLASS 144

32 R 4,003,417

CLASS 145

50 C 4,003,418

CLASS 148

1.5 4,003,759
6.15 R 4,003,761
6.2 4,003,760
11.5 R 4,003,762
15 4,003,763
16.5 4,003,764
20.3 4,003,765
24 4,003,766
105 4,003,767
108 4,003,768
121 4,003,769
174 4,003,770

CLASS 149

17 4,003,771

CLASS 152

312 4,003,419
355 4,003,420
409 4,003,421

CLASS 156

155 4,003,773
180 4,003,774
226 4,003,775
242 4,003,776
246 4,003,777
289 4,003,778
353 4,003,779
519 4,003,780
526 4,003,781
552 4,003,782
656 4,003,772

CLASS 162

168 R 4,003,783
199 4,003,784

CLASS 164

9 4,003,422
34 4,003,423
4,003,424
58 4,003,425

CLASS 165

53 4,003,426
105 4,003,427

CLASS 166

.5 4,003,428
51 4,003,429
85 4,003,430
250 4,003,431
271 4,003,432
298 4,003,433
315 4,003,434
4,003,435

CLASS 172

41 4,003,436
59 4,003,437
4,003,438
4,003,439

CLASS 174

23 C 4,004,077

CLASS 175

61 4,003,440
71 4,003,441
410 4,003,442

CLASS 176

38 4,003,785
39 4,003,786
76 4,003,787
79 4,003,788

CLASS 178

18 4,004,088
22 4,004,089
69.1 4,004,090
70 R 4,004,091

CLASS 179

1 E 4,004,094
1 GQ 4,004,095
1 SC 4,004,096
2 A 4,004,097
15 AL 4,004,099
15 AS 4,004,101
15 BS 4,004,098
4,004,100
16 F 4,004,102
18 EA 4,004,103
70 4,004,104
84 VF 4,004,105
99 4,004,106
4,004,107

100.41 K 4,004,108
170 J 4,004,110
170 NC 4,004,109
175.1 A 4,004,111
178 4,004,112

CLASS 180

27 4,003,443
75 4,003,444
98 4,003,445
132 4,003,446
140 4,003,447

CLASS 181

33 HE 4,003,448
173 4,003,449

CLASS 182

194 4,003,450

CLASS 188

62 4,003,451
71.6 4,003,452
72.4 4,003,453
322 4,003,454

CLASS 190

8 4,003,455

CLASS 191

12.4 4,003,456

CLASS 192

45 4,003,457
105 BB 4,003,458

CLASS 195

1.8 4,003,789
28 R 4,003,790
36 P 4,003,791
63 4,003,792
66 R 4,003,793
4,003,794
103.5 R 4,003,795
142 4,003,796

CLASS 197

1 R 4,003,459
170 4,003,460

CLASS 198

369 4,003,462
374 4,003,463
430 4,003,464
442 4,003,465
452 4,003,466
597 4,003,461

CLASS 200

50 AA 4,004,113
61.56 4,004,114
61.58 B 4,004,115
82 R 4,004,116
144 B 4,004,117
148 B 4,004,118
158 4,004,119
275 4,004,121
310 4,004,120

CLASS 201

28 4,003,797

CLASS 202

160 4,003,798
241 4,003,802
262 4,003,803

CLASS 203

2 4,003,799
9 4,003,800
42 4,003,801

CLASS 204

14 N 4,003,804
27 4,003,805
46 R 4,003,806
59 F 4,003,807
99 4,003,808
157.1 R 4,003,809
159.14 4,003,810
180 R 4,003,811
181 4,003,812
192 4,003,813
195 C 4,003,815
195 S 4,003,814
237 4,003,816
290 F 4,003,817
296 4,003,818
301 4,003,819

CLASS 206

273 4,003,467
387 4,003,468
410 4,003,469

CLASS 208

8 4,003,820
11 R 4,003,821
102 4,003,822

108 4,003,823
4,003,824
120 4,003,825
139 4,003,826
206 4,003,827
251 H 4,003,828
253 4,003,829

CLASS 209

3 4,003,830
315 4,003,831

CLASS 210

19 4,003,832
59 4,003,833
83 4,003,834
232 4,003,835
247 4,003,836
408 4,003,837

CLASS 211

50 4,003,470
56 4,003,471

CLASS 212

3 4,003,472
39 4,003,482
59 A 4,003,474
144 4,003,475

CLASS 214

1 BB 4,003,476
4,003,478
1 D 4,003,479
1 QB 4,003,477
14 4,003,473
4,003,480
17 DA 4,003,481
85 4,003,483
138 E 4,003,484
450 4,003,485
4,003,486
673 4,003,487

CLASS 215

254 4,003,488
260 4,003,489

CLASS 219

10.55 A 4,004,122
69 C 4,004,123
125 R 4,004,125
203 4,004,126
216 4,004,127
346 4,004,128
388 4,004,129
459 4,004,130

CLASS 220

22.3 4,003,490
23.4 4,003,491
62 4,003,492
267 4,003,493
268 4,003,494
4,003,495
270 4,003,496

CLASS 221

84 4,003,497

CLASS 222

1 4,003,498
50 4,003,499
70 Re.29,117
133 4,003,500
135 4,003,501
168 4,003,502
173 4,003,503
178 4,003,504
397 4,003,505
555 4,003,506

CLASS 224

2 B 4,003,507
32 R 4,003,508

CLASS 225

23 4,003,509

CLASS 226

1 4,003,510
3 4,003,511
188 4,003,512

CLASS 228

107 4,003,513

CLASS 229

34 HW 4,003,514
51 SC 4,003,516
52 B 4,003,515

CLASS 232

44 4,004,252

CLASS 235

61.1 4,004,135
61.11 D 4,004,136
61.12 N 4,004,131

61.7 B 4,004,133
61.7 R 4,004,134
92 TF 4,004,137
151.1 4,004,138
151.33 4,004,139
152 4,004,140
194 4,004,141

CLASS 238

349 4,003,517

CLASS 239

4 4,003,518
183 4,003,519
205 4,003,520

CLASS 240

7.1 LJ 4,004,142
10.63 4,004,132
44.15 4,004,143
51.11 R 4,004,144
106 R 4,004,145

CLASS 241

82.4 4,003,521
95 4,003,522
169.2 4,003,523

CLASS 242

18 R 4,003,524
55 4,003,525
55.3 4,003,526
58 4,003,527
106 4,003,528
118.8 4,003,529

CLASS 243

20 4,003,530

CLASS 244

3.22 4,003,531
17.13 4,003,532
42 D 4,003,533
122 R 4,003,534

CLASS 248

188 4,003,535
280 4,003,536
425 4,003,537
467 4,003,538
489 4,003,539
539 4,003,540

CLASS 249

18 4,003,541
31 4,003,542
48 4,003,543
95 4,003,544
112 4,003,545
219 W 4,003,546

CLASS 250

264 4,004,147
328 4,004,150
345 4,004,146
370 4,004,148
397 4,004,149
485 4,004,151
518 4,004,154
562 4,004,152
572 4,004,153

CLASS 251

31 4,003,547
45 4,003,548

CLASS 252

8.5 A 4,003,838
25 4,003,839
62 4,003,840
94 4,003,841
175 4,003,842
182 4,003,843
299 4,003,844
301.4 R 4,003,845
316 4,003,846
350 4,003,847
427 4,003,848
442 4,003,849
455 R 4,003,850
465 4,003,851
466 PT 4,003,852
467 4,003,853
471 4,003,854
519 4,003,855
546 4,003,856
4,003,857

CLASS 254

62 4,003,549
151 4,003,550
169 4,003,551
178 4,003,552

CLASS 256

59 4,003,553

CLASS 259

4 AC 4,003,554

54 4,003,555

CLASS 260

2.5 AC 4,003,859
2.5 AJ 4,003,861
4,003,862
2.5 BE Re.29,118
2.5 FP 4,003,863
4,003,864
2.5 HA 4,003,860
2.5 HB 4,003,858
17 R 4,003,865
17.4 R 4,003,866
17.5 4,003,867
21 4,003,868
29.6 RW 4,003,870
29.6 XA 4,003,869
29.7 R 4,003,871
37 EP 4,003,872
38 4,003,873
42.18 4,003,874
45.9 NC 4,003,875
47 EN 4,003,876
47 UA 4,003,877
49 4,003,878
4,003,879
75 R 4,003,882
4,003,883
75 T 4,003,880
4,003,881
112.5 LH 4,003,884
166 4,003,885
176 4,003,886
239 B 4,003,888
239.1 4,003,887
239.9 4,003,889
240 F 4,003,890
242 4,003,891
243 A 4,003,892
243 C Re.29,119
4,003,893
4,003,894
4,003,896
243 R 4,003,895
4,003,897
247.1 L 4,003,898
248 A 4,003,899
251 R 4,003,900
256.4 N 4,003,901
268 PC 4,003,902
285 4,003,903
293.54 4,003,904
293.55 4,003,905
294.8 F 4,003,906
295 R 4,003,907
295.5 B 4,003,908
307 G 4,003,909
308 D 4,003,910
326.2 4,003,911
326.4 4,003,912
326.9 4,003,913
327 B 4,003,915
327 M 4,003,914
340.5 4,003,916
340.6 4,003,917
340.7 4,003,918
345.5 4,003,919
346.8 A 4,003,920
347.7 4,003,921
348.5 L 4,003,922
369 4,003,923
382 4,003,924
429.2 4,003,937
453 P 4,003,938
453 RZ 4,003,939
456 NS 4,003,940
463 4,003,941
464 4,003,942
465 E 4,003,944
465 H 4,003,943
468 D 4,003,946
468 H 4,003,945
471 R 4,003,947
475 FR 4,003,948
513 R 4,003,925
518 A 4,003,926
520 D 4,003,927
555 A 4,003,928
556 A 4,003,929
570 R 4,003,932
570.5 P 4,003,931
570.7 4,003,930
583 K 4,003,933
586 G 4,003,934
4,003,935
590 C 4,003,936
590 R 4,003,949
612 R 4,003,950
617 F 4,003,951
641 4,003,952
645 4,003,953
667 4,003,954
4,003,956
673.5 4,003,955
4,003,957
677 R 4,003,958

837 R 4,003,959
857 F 4,003,960
874 4,003,961
884 4,003,962
897 C 4,003,963
930 4,003,964
932 4,003,965
971 4,003,966

CLASS 261

30 4,003,967
35 4,003,968
145 4,003,969
159 4,003,970

CLASS 264

9 4,003,971
40.3 4,003,972
101 4,003,973
119 4,003,758
210 F 4,003,974

CLASS 266

48 4,003,556
169 4,003,557
198 4,003,558
204 4,003,559
217 4,003,560
220 4,003,561

CLASS 267

54 R 4,003,562
100 4,003,563
108 4,003,564

CLASS 270

58 4,003,565
4,003,566

CLASS 271

12 4,003,567
225 4,003,568
259 4,003,569
265 4,003,570

CLASS 272

56 4,003,571

CLASS 273

29 A 4,003,572
58 K 4,003,573
65 EC 4,003,574
95 A 4,003,575
106.5 C 4,003,576
134 AC 4,003,578
134 C 4,003,577
134 CF 4,003,580
148 R 4,003,579

CLASS 277

34.6 4,003,581

CLASS 280

11.2 4,003,582
43.22 4,003,583
91 4,003,584
145 4,003,585
446 B 4,003,586
637 4,003,587
743 4,003,588

CLASS 282

27.5 4,003,589

CLASS 285

110 4,003,591
336 4,003,590

CLASS 289

18 4,003,592

CLASS 292

92 4,003,593

CLASS 293

84 4,003,594

CLASS 294

19 R 4,003,595

CLASS 296

23 R 4,003,596
28 R 4,004,124
97 C 4,003,597

CLASS 297

194 4,003,598
220 4,003,599
454 4,003,600

CLASS 298

22 C 4,003,601

CLASS 299

18 4,003,602
37 4,003,603

CLASS 301

37 CD 4,003,604

CLASS 303

6 M 4,003,605
9 4,003,606
92 4,003,607

CLASS 305

57 4,003,608

CLASS 307

52 4,004,155
113 4,004,156
235 C 4,004,157
235 T 4,004,158
238 4,004,159
253 4,004,160
261 4,004,161
269 4,004,162
279 4,004,170
293 4,004,163
297 4,004,164

CLASS 308

217 4,003,609

CLASS 310

8.1 4,004,165
8.2 4,004,166
41 4,004,168
71 4,004,169
154 4,004,167

CLASS 312

100 4,003,610
244 4,003,611
245 4,003,612
293 4,003,613
320 4,003,614

CLASS 313

15 4,004,171
217 4,004,172
317 4,004,173
330 4,004,174
360 4,004,175
371 4,004,176
390 4,004,177
468 4,004,178

CLASS 314

60 4,003,615

CLASS 315

3.5 4,004,179
4,004,180
5.41 4,004,181
12 R 4,004,182
58 4,004,183
101 4,004,184
105 4,004,185
167 4,004,186
205 4,004,187
261 4,004,188
335 4,004,189
403 4,004,190

CLASS 317

9 PF 4,004,191
16 4,004,192
33 SC 4,004,201
70 4,004,193
100 4,004,194
4,004,195
101 CC 4,004,196
119 4,004,197
155.5 4,004,198
230 4,004,199
242 4,004,200

CLASS 318

138 4,004,202
171 4,004,203
472 4,004,204
608 4,004,205
636 4,004,206
695 4,004,207

CLASS 320

2 4,004,208

CLASS 321

4,004,209

CLASS 322

2 R 4,004,210
63 4,004,211

CLASS 323

19 4,004,214
56 4,004,215

CLASS 324

3 4,004,212
15 4,004,213
41 4,004,216
43 R 4,004,217
57 SS 4,004,218
58.5 A 4,004,219
62 4,004,223
103 P 4,004,220
158 R 4,004,221
4,004,222

CLASS 325

2 4,004,224
4 4,004,225
42 4,004,226
67 4,004,227
113 4,004,228
361 4,004,229
363 4,004,230
420 4,004,231
421 4,004,232
470 4,004,233

CLASS 328

5 4,004,234
110 4,004,235
138 4,004,236
155 4,004,237
165 4,004,238

CLASS 329

109 4,004,239

CLASS 330

10 4,004,246
14 4,004,240
15 4,004,241
22 4,004,242
4,004,243
4,004,244
30 D 4,004,245
4,004,247

CLASS 331

94.5 P 4,004,248
4,004,249
94.5 PE 4,004,250
113 A 4,004,251

CLASS 333

28 R 4,004,253
30 R 4,004,254
31 R 4,004,255
32 4,004,256
73 C 4,004,257

CLASS 335

17 4,004,258
146 4,004,259
202 4,004,260
280 4,004,261
281 4,004,262

CLASS 337

32 4,004,263

CLASS 338

174 4,004,264

CLASS 339

8 R 4,003,616
17 C 4,003,617
22 B 4,003,619
22 R 4,003,618
29 R 4,003,620
59 M 4,003,621
75 P 4,003,622
97 C 4,003,623
146 4,003,624
176 MP 4,003,625

CLASS 340

2 4,004,265
9 4,004,266
15.5 TA 4,004,267
17 R 4,004,268
52 A 4,004,269
58 4,004,270
4,004,271
4,004,272
64 4,004,273
84 4,004,274
168 S 4,004,275
171 A 4,004,276
172.5 4,004,277
4,004,278
4,004,279
4,004,280
4,004,281
4,004,282
4,004,283
173 CA 4,004,285
173 DR 4,004,284
173 R 4,004,286
174 TF 4,004,287
237 S 4,004,288
267 R 4,004,289
279 4,004,290
310 R 4,004,291
324 AD 4,004,085

CLASS 350

6 4,003,626
7 4,003,627
77 4,003,628
96 C 4,003,629
99 4,003,630
160 LC 4,003,633
160 R 4,003,631
4,003,632
162 R 4,003,636
162 SF 4,003,634
166 4,003,635
286 4,003,637
293 4,003,638
294 4,003,639
310 4,003,640
4,003,641

CLASS 351

6 4,003,642

CLASS 352

14 4,003,643
72 4,003,644
109 4,003,645
141 4,003,646
194 4,003,647

CLASS 355

3 R 4,003,648
4 4,003,649
14 4,003,650
16 4,003,651
71 4,003,652
77 4,003,653
125 4,003,654

CLASS 356

4 4,003,655
71 4,003,656
100 4,003,657
110 4,003,658
152 4,003,659
178 4,003,660
201 4,003,661
206 4,003,662
243 4,003,663

CLASS 358

44 4,004,292
60 4,004,093
83 4,004,078
109 4,004,086
113 4,004,087
125 4,004,083
128 4,004,080
4,004,081
133 4,004,084
141 4,004,082
246 4,004,092
256 4,004,079

CLASS 360

67 4,004,293

CLASS 401

4,003,664
259 4,003,665

CLASS 403

36 4,003,666
4,003,667
287 4,003,668
288 4,003,669

CLASS 408

185 4,003,670

CLASS 415

1 4,003,671
71 4,003,672
80 4,003,673
116 4,003,674
150 4,003,675

CLASS 416

132 B 4,003,676
208 4,003,677

CLASS 417

88 4,003,678
246 4,003,679
269 4,003,680

CLASS 418

36 4,003,681
107 4,003,682

CLASS 423

24 4,003,975
213.5 4,003,976
236 4,003,977
237 4,003,978
239 4,003,979
261 4,003,980
335 4,003,981
351 4,003,982
384 4,003,983
468 4,003,984
512 A 4,003,985
567 A 4,003,986
570 4,003,987

CLASS 424

12 4,003,988
43 4,003,989
78 4,003,990
81 4,003,991
101 4,003,992
104 4,003,993
157 4,003,994
180 4,003,995
181 4,003,996
182 4,003,997
4,003,998
195 4,003,999
200 4,004,000
4,004,001
230 4,004,002
238 4,004,003
4,004,004
243 4,004,005
245 4,004,006
246 4,004,007
248.54 4,004,008
250 4,004,009
260 4,004,010
261 4,004,011
263 4,004,012
265 4,004,013
266 4,004,014
4,004,015
273 4,004,016
274 4,004,017
277 4,004,018
4,004,019
278 4,004,020
4,004,021
279 4,004,022
282 4,004,023
285 4,004,024
308 4,004,025
311 4,004,026
317 4,004,027
321 4,004,028
325 4,004,029
4,004,030
327 4,004,031
330 4,004,032
347 4,004,033

CLASS 425

6 4,003,683
76 4,003,684
135 4,003,685
373 4,003,686
406 4,003,687
465 4,003,688
466 4,003,689
4,003,690

CLASS 426

29 4,004,034
275 4,004,035
285 4,004,036
324 4,004,037
422 4,004,038
548 4,004,039
564 4,004,040
601 4,004,041

CLASS 427

34 4,004,042
43 4,004,043
4,004,044
55 4,004,045
85 4,004,046
142 4,004,047
158 4,004,048
207 C 4,004,049
302 4,004,050
304 4,004,051
374 F 4,004,052
379 4,004,053
385 R 4,004,054
431 4,004,055

CLASS 428

138 4,004,056
209 4,004,057
215 4,004,058
224 4,004,059
290 4,004,060
349 4,004,061
383 4,004,062
4,004,063
421 4,004,064
532 4,004,065
538 4,004,066

CLASS 429

57 4,004,067
4,004,068
149 4,003,754
178 4,003,755
199 4,003,753
219 4,003,757

CLASS 431

116 4,003,691
158 4,003,692
202 4,003,693
344 4,003,694

CLASS 432

219 4,003,695
238 4,003,696
4,003,697

CLASS 526

48 4,004,069
86 4,004,070
116 4,004,071
214 4,004,072
252 4,004,073
305 4,004,074
342 4,004,075

CLASSIFICATION OF DESIGNS

D6—	3	243,042	D7—	1	243,056		261	243,070		189	243,081		80	243,095		15 AM	243,107
	45	243,043		41	243,057	D10—	22	243,071	D15—	104	243,116	D26—	1 B	243,090			243,108
	47	243,044			243,058		68	243,072		127	243,117		1 J	243,097			243,109
		243,045		97	243,059		109	243,073	D16—	42	243,082		5 C	243,098		15 LL	243,110
	56	243,046		184	243,060			243,074		65	243,083		14 A	243,091		15 VV	243,111
	61	243,047		206	243,061			243,075		77	243,084			243,096	D48—	20 E	243,115
	132	243,048	D8—	259	243,062		126	243,076	D19—	64	243,085	D27—	10	243,099	D56—	1 A	243,118
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Elliot L. Richardson, Secretary

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C. Marshall Dann, Commissioner